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Monmouth
8°. 6

George A. D. Monmouth

S. 6

A

REPORT

ON THE

SANITARY CONDITION

OF THE TOWN OF

ABERGAVENNY:

WITH REMEDIAL SUGGESTIONS, FOUNDED CHIEFLY UPON THE
REPORTS OF THE HEALTH OF TOWNS COMMISSION.



BY

SAMUEL H. STEEL, M.B., LOND.

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## PREFACE.

THE enquiries that have been made, during late years, into the sanitary condition of the population of Great Britain, have resulted in the disclosure of the existence of an appalling amount of sickness and mortality clearly traceable to the unhealthy circumstances by which the dwellings of the lower classes, in urban districts especially, are surrounded. Profoundly impressed with the conviction—like all others who have paid attention to the subject—that the greater part of this mass of misery may be prevented by judicious sanitary arrangements, and anxious to contribute, even in the slightest degree, to the furtherance of an object so important, I venture to publish this pamphlet on the condition of my native place, at the suggestion of a friend, eminent for his enthusiastic benevolence, and for the energy and talent which he has devoted to the cause of sanitary reform: and I have been encouraged by the belief, that the general public will be most readily induced to take an interest in the movement now in progress, by revealing to the inhabitants of each town, the defects of their own particular locality. This report contains some descriptive details with which residents in the town are necessarily familiar; these have been given to render it more intelligible to persons unacquainted with the place, in the hope that it may be useful to the advocates of sanitary reform as an exposition of the state of small towns, such as this, which have not hitherto attracted much attention. The sketch of remedial suggestions which follows the report, is intended only as a slight indication of the means required for the improvement of public health. It is founded almost entirely upon the Reports of the Health of Towns Commission, as these reports constitute the basis of all that has been done since their publication, and may be more easily referred to for confirmation of my statements, than if I had quoted from numerous detached authorities.

I am indebted to my brother, Mr. T. Dyne Steel, Graduate of the Institute C.E., for many suggestions, and for various facts respecting the water-works. I beg also to thank the Union Officers, the Registrar, the Clerk to the Commissioners, and others, for the information they have afforded me.

S. H. S.



# ERRATA.

- Page 6, line 2, for "conglomerate," read "conglomerate."  
 line 16, before "population," insert the words "working class of the."  
 Table I., col. 1, line 2, for 30, read 13; col. 5, last line, for 78, read 73.  
 Page 8, line 5, for 42, read 43.  
 Table V., line 1, for 44, 27, 19, read 45, 26, 16.  
 Table VI., col. 1, last line, for 76, read 79; col. 11, line 2, for 5, read 6.  
 Page 12, line 7, insert "of," between the words "That the."  
 Page 30, line 10, for 829, read 841.  
 Table VII., part 2, col. 2, for 15.3, read 14.4.  
 Table VIII., col. 1. line 9, for £7406. 10s. Od., read £5960. 0s. Od.  
 col. 2, line 6, for £79. 17s. Od., read £79. 17s. 10d.  
 Page 50, line 1, read "6s. each additional for a tap."  
 Page 51, line 19, for "arising," read "mixing."  
 Page 55, line 4 from bottom, for 240, read 180.  
 Page 66, table, col. 5, for 5.18, read 0.2.

## A REPORT, &c.

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THE parish and town of Abergavenny, in the county of Monmouth, on the borders of Breconshire, contains 1049 houses, and a population, according to the census of 1841, of 4953 persons. The town lies on the main road into South Wales. It is seated on a slightly-elevated ridge of ground, nearly equidistant between the Bloreng, Sugar Loaf, and Skyrriid Fawr mountains. The river Usk, winding through the beautiful valley of the same name in a south-easterly direction, passes at the distance of a quarter of a mile on the southern side of the town. The ridge of ground on which the town is built slopes on one side abruptly towards the river, from which it is separated by a broad flat meadow, sometimes flooded by heavy rains; on the other, gently in a south-eastern direction down to the brook Kibby; on this slope the central and most important streets are situated. The ruins of the castle occupy the southern and narrowest extremity of the ridge. The Kibby brook rises in the Sugar Loaf mountain at a considerable elevation, takes a south-easterly course, passing through the north-east part of the town, where it serves as a common sewer; at the east end of the town it joins the Gavenny, another brook flowing from the north-east, and the two, very shortly after their junction, empty themselves into the river Usk.

The geological formation of the district is the old red sandstone of Wales. Beds of the conglomerate on which Abergavenny is built, attain in this neighbourhood a thickness of upwards of 200 feet. The surface soil is a light porous gravel; the sub-soil a somewhat stronger gravel. Clay, suitable for brickmaking, is found in various places. Houses are built either of brick, or of a hard sandstone quarried in the neighbouring mountains. It is best known in this locality as the Derry stone, after the hill from which it is most extensively obtained. Sheltered on all sides by high mountains, the summits of those before-mentioned being upwards of 1800 feet above the level of the river, the temperature in winter is higher than the average of other places in the same latitude; the atmosphere, though mild, is dry and bracing, and is perpetually renovated by the currents of air which flow up and down the valley.

The population consists partly of mechanics of various descriptions, as masons, carpenters, &c., and partly of agricultural labourers. Wages are tolerably good; those of the former class varying from 3s. to 4s. per diem; of the latter from 10s. to 14s. per week, according to the constancy of employment and the season of the year. The most numerous body of mechanics is perhaps that of shoemakers. Shops of all kinds are good; there is also a good market; and an extensive trade in candles, groceries, shoes, and other articles, is carried on with the adjacent iron district.

From this account, it is clear that the locality possesses, in an eminent degree, every advantage for the maintenance of health and the prolongation of human life. Let us see whether the registry of mortality confirms this conclusion.

The following table exhibits the number of deaths, and the ages at which they have taken place, in the parish of Abergavenny, during the ten years, commencing July 3, 1837, and ending July 3, 1847.

TABLE I.

From July 3, 1837, to July 3, 1838.	Under 6 months.	6 mths. & under 1 year.	1 & under 6.	Total under 6 years.	5 & under 10.	10 & under 20.	20 & under 30.	30 & under 40.	40 & under 50.	50 & under 60.	60 & under 70.	70 & under 80.	80 & under 90.	90 & under 100.	Total in each.	Deaths from violence. 5 y. 60 y 100.		
	16	13	22	51	13	3	15	5	4	5	5	5	9	2	117	0	1	0
1838-39	30	10	9	32	5	4	3	6	7	9	13	8	3	0	90	0	4	0
1839-40	32	6	17	55	7	6	9	4	12	9	7	9	13	1	132	0	1	1
1840-41	26	8	22	56	8	7	10	9	15	5	12	10	2	1	135	0	1	1
1841-42	30	13	21	64	12	6	9	9	7	8	9	10	7	0	141	1	2	0
1842-43	15	5	15	35	9	6	10	5	7	5	6	11	6	2	102	1	1	1
1843-44	15	8	28	51	13	5	6	9	4	8	9	10	9	1	125	0	5	0
1844-45	22	6	5	33	1	3	3	4	8	3	5	10	16	0	86	0	3	0
1845-46	7	3	21	31	2	7	4	7	5	5	6	13	6	0	86	0	3	0
1846-47	13	6	8	27	3	3	13	12	12	9	11	3	14	2	109	0	1	0
Total..	189	78	168	435	78	50	82	70	81	66	83	89	85	9	1123	2	22	3

Total.... 1150

The following results are deduced from the numbers exhibited in this table :—

1. That the population of the parish, amounting, according to the census of 1841, to 4953, one death takes place annually for every 42 persons living.

2. That 38 per cent. of the total amount of deaths take place under the age of five years.

3. That only 23 per cent. of the total deaths occur above the age of sixty years.

The following are parallel results, obtained from the places under-mentioned :—

TABLE II.

	One death per annum to persons living.
England	46
London	39
Birmingham (in 1838)	40
Leeds (in 1838)	37
Liverpool (most unhealthy town in England, in 1838)	31
Lancashire (most unhealthy county).....	37
Monmouthshire	45
Part of Surrey (best return in England)	55

TABLE III.

Registrars' Districts.	Deaths per cent. per ann. under 5 years.	Deaths per cent. per ann. above 60 years.
Marylebone.....	38.7	19.3
Bethnal Green	48.4	18.5
Manchester	50.7	12.5
Leeds	49.1	14.6
Rotherham	38.2	20.9
York	36.4	26.1
Builth, Brecknock, Crickhowell, and Hay	35.4	26.5
Truro	34.2	25.3
Exeter	39.0	23.6

The results stated in Table II. for England, London, Lancashire, Monmouthshire, and Surrey, are the averages of the seven years 1838-1844. Table III. has been compiled from the return for the years 1840, 41, and 42, except in the case of Exeter, in which the average of the five years, 38-42, is given.

The above districts have been selected for the formation of the tables, because they present circumstances of nearly every variety which can be supposed to affect public health. Marylebone is one of the best districts of the metropolis, but includes a large number of the lower class of houses. Bethnal Green is a poor district, thickly inhabited chiefly by silk weavers, who live under very unhealthy circumstances. Manchester and Leeds are large manufacturing towns, their sanitary condition very defective; Rotherham smaller and less crowded. Birmingham is the most healthy of the large manufacturing towns; this is chiefly attributable to its numerous gardens, good sewerage, and the absence of cellar dwellings. York and Exeter are generally handsome, well-built cities; but some parts of them inhabited by the poor, are extremely unwholesome. Truro is a well-built town, situated near a fine sea coast, and enjoying a mild climate. The Builth district is partly rural and partly urban, as it includes several small towns; it is thinly inhabited and poor. These districts, though differing widely among themselves as regards their sanitary condition, are all far removed from excellence. It will be observed that the mortality of Abergavenny is nearly the same as that of Marylebone, Exeter, and Rotherham; and is greater than that of York, Truro, and the Builth district.*

Table IV. exhibits the average longevity of the different classes in Abergavenny: it may be compared with Table V.

TABLE IV.

No. of deaths.	Abergavenny.	Average age of deceased.
36	Gentlemen, professional persons, and their families	44.3
119	Tradesmen and their families	27.7
693	Mechanics, labourers, &c., and their families	26.8

* Deaths in the Union Workhouse, in the parish of Abergavenny, have not been included either in Table I. or in the subsequent Table VI., as they are not referred in the registries to their respective parishes. The population of the whole Union amounts to 60,764; and during the ten years, July 1837-47, 200 deaths took place in the Workhouse;—of these, 19 (according to the proportion of the population, would be due to Abergavenny, and 17 to the parishes included in Table VI. This should be borne in mind in comparing the above tables.

TABLE V.

	No. of deaths.			Average age of deceased.		
	Gentle- men.	Trades- men.	Mecha- nics, &c.	Gentle- men.	Trades- men.	Mecha- nics, &c.
Bethnal Green....	101	273	1258	44	27	19
Manchester				38	20	17
Leeds	79	824	3395	44	27	19
Bath.....	146	244	896	55	37	25
Truro	33	138	449	40	33	28
Kendal Union....	52	138	413	45	39	34

In constructing the Abergavenny table, all cases in which the description of employment was imperfect, and all beerhouse keepers, excisemen, postillions, and farmers, were rejected. The average duration of life among tradesmen is so low as to lead to the suspicion that the result is fallacious; probably the number of facts is too small to afford a correct average. Table V. requires no comment, except that notwithstanding the high sanitary reputation of Bath, many of the lower parts of the town are as unhealthy as the worst places in England; while the high average age of the gentry is doubtless due to the town being the resort of so many aged persons of the upper classes. The population of the Kendal Union is partly mining and manufacturing, and partly agricultural.

But the depreciation of the value of life in Abergavenny will be most strikingly apparent from an inspection of a table of mortality formed from the registry of the following rural parishes lying in the immediate neighbourhood of the town; viz., Llandilo Pertholey, Llanellen, Llanover Lower, Llanwenarth Citra, Llangattock-juxta-Usk, Llangattock Lingoed, Llanvapley, Llanthewy Rytherch, Llanthewy Skyrrid, Llanvihangel Crucorney, Fwthog, Cwmyoy Upper and Lower, Bwlch Trewyn, and Oldcastle. The population of these parishes amounted, in 1841, to 4390, or 563 less than that of Abergavenny.

TABLE VI.

From July 3, 1837, to July 3, 1838.	Under 6 months.	6 mths. & under 1 year.	1 & under 5.	Total under 5 years.	5 & under 10.	10 & under 20.	20 & under 30.	30 & under 40.	40 & under 50.	50 & under 60.	60 & under 70.	70 & under 80.	80 & under 90.	90 & under 100.	Total in each year.	Deaths from violence.		
																5 y.	60 y	100.
	5	2	12	19	3	7	7	3	5	4	5	11	9	2	75	2	1	1
1838-39	15	3	4	22	2	3	2	4	1	4	5	8	7	1	60	1	1	0
1839-40	11	6	2	19	1	7	3	6	3	3	10	11	8	3	74	0	3	1
1840-41	9	2	3	14	3	4	3	5	2	5	7	5	7	3	58	0	2	0
1841-42	5	2	4	11	2	3	7	5	5	4	6	10	4	1	58	0	1	0
1842-43	15	2	9	26	3	6	2	2	7	4	8	8	9	0	75	2	2	0
1843-44	5	5	10	20	6	1	2	2	2	2	15	8	10	2	70	0	1	0
1844-45	4	1	6	11	0	2	7	5	4	6	10	7	6	3	61	2	1	0
1845-46	4	1	1	6	3	4	4	5	1	3	8	6	5	2	47	0	4	0
1846-47	6	2	4	12	2	5	3	1	5	6	6	10	7	3	60	0	0	1
Total..	76	26	55	160	25	42	40	38	35	41	81	84	72	20	638	7	16	3

Total.... 664

Care has been taken to select purely agricultural parishes for the construction of this table; Llanfoist, Llanwenarth Ultra, and Llanover Upper, where a large proportion of the population is manufacturing, have been excluded. The chief results are,

1. That in the rural districts around Abergavenny, the annual proportion of deaths to persons living is 1 to 66 only.

2. That the total amount of deaths, 25.15 per cent. only, occur under the age of 5 years.

3. That 39.1 per cent. of the total deaths occur at upwards of the age of 60 years.

This table contrasts very remarkably with Table I. in many other respects; for instance, it shows that during the last ten years, the number of deaths at the age of 90 and upwards, is twice as great in the country as in the town, although the population numbers 563 less. Deaths by violence are more numerous under the age of five in the country than in the town; they are almost always caused by burns, the children being more frequently left unattended. The violent deaths alter in some degree the per centage returns deduced from the table, the difference being in favour of the town.

Let us now proceed to investigate the causes of the high rate of mortality in Abergavenny. The human frame can become diseased in three ways only, 1. By lesion of some of the various organs of which it is constructed, in consequence of the insufficient quantity or improper quality of the supply of elements necessary to the performance of their functions.* 2. By the agency of noxious matters received into the system, as the poison of small-pox, foul emanations, &c. 3. By the natural decay or wearing out of the organs—a process which, under favourable circumstances, should not commence under an average of 60 years of life. It follows, therefore, that the most important means for the preservation of health are a plentiful supply of air unvitiated by intermixture with hurtful agents, for the purification of the blood; of water, to ensure cleanliness and freedom of action to the skin, and to afford the means of purifying houses and domestic utensils from dirt and refuse; of arrangements for the complete removal of all offensive and refuse matter; of light, without which all living things become weak and sickly; of good

* Exposure to cold and wet, a frequent cause of disease, is to be considered in the light of an accident.

wholesome food ; of warmth and shelter. Nearly all these requisites are extremely deficient in Abergavenny. The streets, like those of all places anciently fortified, are narrow, with the exception of Cross-street, and some of the streets situated without the old wall. Courts and lanes, inhabited by the lower classes, are very numerous, and many are in a most filthy condition. The following is a description of some of them.

St. John's-lane, near the centre of the town, connects Nevill or Rother-street and Chicken-street. It is about eight feet wide, and is formed on one side by the backs of the High-street houses, on the other by a row of small close tenements of two stories. The pitching is very uneven, and a gutter running down the centre, with a very imperfect and irregular fall, being the receptacle of all the liquid refuse, is generally half full of dirty stagnant water. The ashes and all other filth are deposited in a heap at the Nevill-street entrance of the lane, and are removed twice a week by a farmer for manure. There is one privy in the lane, but it is private property, and usually kept locked.

In Flannel-street or Butcher-row, there are three courts. One of them, very narrow, is closed overhead by the first floor rooms of the houses on each side being built over it. It contains three small houses, with windows which do not open. Two or three dirty water tubs stand in the court, and a gutter runs down it into the street. In another court in Flannel-street, the cesspool of the privy communicates with a large ash pit : both are within two yards of the house doors. When I last saw it, the ash pit was very full, and the filth from the cesspool was oozing out into the yard.

Cross-street Ward.—In Traitor's-lane, close behind the Market-place, is a block of eleven houses, crowded in one mass so as to render even tolerable ventilation impossible. The rooms are small and close ; several of the houses are inhabited by the lowest class of the population, prostitutes and their associates. On one side of the block is a privy, without a door, the roof falling in, the front open, so that no one can pass without seeing it, the soil appearing above the level of the seat, so as to render use impossible. Close by the privy is a manure heap, and beyond that a slaughter-house, a yard attached to which is covered with pools of mingled water, blood, and urine. At the bottom of this yard flows the Kibby, the open common sewer of the town. In one of the houses, in which I lately

attended two cases of fever, I found a family of eight persons sleeping in a room twelve feet square, the opening in the wall which served as a window being one foot square. In the room were two chamber utensils, filled to the brim with soil and urine. The inhabitants of these houses have no water except that of the Kibby.

Tudor-street.—Near the lower end of Tudor-street is the Pant-lane, and, joining it at right angles, a row of houses facing the street, but standing on ground several feet below the level of the roadway. The windows of these houses are small and insufficient. Behind each back door is a heap of every description of refuse. Till about a year and a half ago, there was but one privy common to this row of houses and those in the Pant-lane, altogether twelve in number, and that in so dilapidated a condition as to be totally useless. Since then, two decent privies have been built; but these are not sufficient, since the number of persons who use, or ought to use them, can never be less than fifty, several of the houses being lodging-houses. The cesspool is a mere open hole dug in the garden, close behind the upper house. It is seldom cleaned out, and when I saw it, it presented a most disgusting spectacle, and the stench was intolerable. The lane is always so dirty, from the foul water and filth thrown into it, as to be nearly impassable. The commissioners have recently issued an order, forbidding the deposit of ashes and solid refuse in the lane; but little improvement has resulted, as dirty water is thrown out as usual. Cases of fever are very frequent in this place.

Prosser's-yard consists of eleven small and badly-ventilated houses. One privy at the upper end of the yard serves for the whole number. It is constructed of a few boards, is open in front, and unsheltered. A hole dug in the ground serves for a cesspool. The entire thing is indescribably filthy, and almost unapproachable from the stench.

There are four other courts in Tudor-street, more or less objectionable. Privies insufficient, and ash pits so placed that they cannot but be highly noxious.

Frogmore-street Ward. The worst court in Frogmore-street is Price's-yard, a long passage about three feet in width, and consisting of thirteen houses of the poorest description. The largest rooms do not measure more than twelve feet square, and many are much smaller. The windows are miserably insufficient, some not made

to open at all, others boarded up, the glass having been broken. The stone floors are full of holes, and nearly all the houses are in a ruinous condition. There is no privy, and soil and refuse are thrown into an old unroofed house at the upper end of the yard. The stench, when the wind blows from this place, is much complained of by the inhabitants.

Monk-street Ward.—In Monk-street, near the turnpike gate, is Burton's-yard, containing six dilapidated houses. The privy is very filthy, and the upper part of the yard is covered with soil. Opposite the house doors are several very dirty and offensive pigstyes.

Ireland-street.—Most of the houses in this street are small, ill ventilated, and dirty, and are inhabited by the lowest class of prostitutes and others. All refuse water is thrown out into the street, which is always very dirty, and disgusting to respectable persons.

Drew's or Whitehorse-yard, contains ten houses, most of them consisting of a ground floor only; they are in very bad repair; the rooms are small, and windows insufficient. There is one very dirty privy, the path to it leading over an ash and dung heap. An offensive drain runs down the court into the street.

Mill-street Ward.—Crown-yard is a small irregular court of four houses, very confined and dirty. The brook Kibby runs beneath the pavement, and one privy is placed over it, at the bottom of the yard; another, belonging to a public-house, at the top. In the centre, the pavement and arch of the sewer have fallen in, leaving a hole large enough to receive a hogshead. The inhabitants complain, that in hot weather, when the water in the brook is low, the stench arising from this opening is overpowering.

Whistance's-yard is a straight passage, from forty to fifty yards long, and about three feet wide. At the top is an open space covered with accumulated refuse. The uppermost house contains three rooms, two upstairs and one below, all used as sleeping rooms. Opposite, and within two feet of the door, is a ruined house, used indifferently as a privy and a pigstye; it is half full of fallen bricks, and evidently never cleaned; the stench from it penetrated the whole of the inhabited house. Of the thirteen houses in this yard, seven are either wholly or partly inhabited; the remainder are ruinous, and are used as depositaries of ordure and other filth. The gutter is dirty and out of repair. A woman living in one of the

houses, said that in summer the foul smell is often so great as to make them all sick and deprive them of appetite.

There are many other courts in various parts of the town, most of them better than those I have described, but all exhibiting arrangements more or less defective;—for instance, Wyke's-yard, in Tudor-street, one of the largest and most open in the town, has at the top an ash heap and a stable; at the bottom a double privy, the cesspool of which is emptied only when it becomes too full to be longer endurable. I observed once during last summer, the soil oozing out between the brick-work on the level of the pitching; the inhabitants of the house next it had endeavoured to stop the hole with a stone and a little clay. No regulations for sweeping and cleaning are anywhere enforced; whatever is done, is the work of any person who chooses to take the trouble. A drain, from which unpleasant emanations arise, runs through the centre of nearly every court. Privies, though not so filthy as those above described, are small and inconvenient, and in number quite inadequate to the wants of the population; they are built too near the houses, and invariably lead into cesspools, which are not emptied until they become useless from the accumulation. When an ash pit exists, it is placed in some conspicuous part of the yard, and all the houses are subject to the odours arising from the heterogeneous filth which it contains.

Drainage and Sewerage.—I have been unable to obtain complete information respecting the sewerage of Abergavenny, as no plan nor writtint account of it exists. It appears, however, that there are culverts in most of the principal streets; but they are generally ill constructed, and are placed at insufficient depths. For the following particulars I am chiefly indebted to Mr. William Price. A barrel drain, 18 inches in diameter, commences in High-street, at the corner of Chicken-street, passes down Cross-street, and empties itself into the Kibby, near St. Mary's Church; its depth varies somewhat, but does not average more than two feet. The fall and the supply of water suffice to keep this sewer always clear. It is joined by a short culvert from the lower part of Chicken-street; by another, which commences about the middle of High-street, on the southern side; and by a third, which traverses nearly the whole of Flannel-street. The last is a semicircular drain of five bricks, covered in with a flat stone; its depth is about 18 inches.

The upper part of Frogmore-street is furnished with the only efficient sewer in the town ; this is a brick barrel drain, two feet in diameter, which commences at the corner of Nevill-street and High-street, and passes down Frogmore-street as far as Lion-street, where it joins an older and smaller barrel drain, by which the sewage is carried into the Kibby, behind the White Horse public-house. The upper part of this sewer has been lately built, and is about nine feet deep. A barrel drain, commencing in the Bull-square, in Rother Ward, passes down the upper part of Tudor-street to the Byfield Gardens, where the sewage is received into an open cesspool and stagnant ditch. A drain from Nevill-street, of the same construction as that in Flannel-street, joins this one, and completes the enumeration.

In other parts of the town, the surface water is carried off by drains which have been made from time to time as they were required. They are small square drains made with tile, or oftener, with stone, and are very liable to become choked up. One on the south side of the lower part of Frogmore-street, with which several smaller communicate, has little or no fall, and is always full. Water may be seen, in rainy weather, standing an inch deep over the gratings leading to this drain. In that part of Tudor-street where the houses on each side stand on ground considerably above the level of the roadway, the house drains empty themselves into the street gutter, the contents flow down the hill to a drain at the bottom, by which they are carried into a garden. The gullies leading to the drains are all, as usual, perpendicular shafts which join the drain at right angles ; as a consequence of this, rubbish often accumulates at the bottom of the shaft, so that the flow is prevented, and it becomes half filled with dirty stagnant water. A gully at the entrance of Whistance's-yard is frequently in this state, and emits a strong stench. None of the gratings are furnished with traps ; but the smell from them, except in such cases as I have just mentioned, is not often offensive, as few water-closets communicate with the sewers. The Frogmore-street and Cross-street sewers, which receive from a small number of closets, are kept clear by the fall and the supply of water.

The brook Kibby, after supplying the town reservoir with water, continues its course in a south-easterly direction, through the suburb of Penypound, and enters the town at the lower end of Frog-

more-street. It runs behind the houses on the north side of Frogmore-street, crosses under Lion-street into the gardens between High-street and Cross-street on one hand, and Lion-street on the other; here it divides for about 120 yards; again uniting, it crosses beneath Monk-street and the gate house, and flows thence behind or under the houses on the north side of Mill-street; at the lower part of Mill-street, it gets beneath the pavement till it reaches an open pond at the corner of Upper and Lower Mill-streets. A considerable stream, brought from the Gavenny, also enters this pond, after supplying a tan yard. From the pond the water flows by two courses; one behind Lower Mill-street, the other beneath the street, through the Castle ditch; both join the Gavenny, but at different points. Throughout its course, except where it runs beneath streets or houses, this sewer is open; and during the late dry weather, has presented a most disgusting spectacle of mingled semi-stagnant water, mud, and soil, emitting, in many places, an odour that impregnated the air perceptibly to a considerable distance. The pernicious effect upon the health of the inhabitants, exercised by a nuisance such as this, extending from one end of the town to the other, may easily be conceived. The pond in Mill-street is filled chiefly with the water of the stream diverted from the Gavenny, and is not generally a source of much annoyance; but when any impure operation is going on in the tan yard, or when the Gavenny water is shut off, and the Kibby undiluted passes through, the stench in hot weather is abominable.

House drainage is very deficient in Abergavenny; houses of the better class are usually provided with square drains, which carry the refuse water either into the street drain, or more frequently into a cesspool. Overflow-drains for cesspools are not often found necessary, as the water sinks readily through the porous soil. The poorer houses seldom have drains, and the refuse water is thrown out into the street. The newly-built houses in the Groffield are provided with small imperfect drains, which carry the water into a hole in the garden.

The old offensive system of privies and cesspools obtains in all quarters. The state of many of these foci of filth I have already described. Where there is a garden behind the house, the privy is generally placed at some distance, but in other cases it is always so near the back door as to prove a constant source of annoyance.

Many houses in Butcher-row, and in some parts of Rother Wards, are without any privy; and I have been informed of one instance in Butcher-row, of a cellar being used both as an ash pit and cess-pool. The Local Act orders that privies shall be cleaned only between the hours of eleven at night and five in the morning. The work is done by night-men, and the charge varies according to circumstances. Occasionally a farmer lends his cart on condition of receiving the manure; many of them, however, refuse to soil their implements in this way. Sometimes the occupier has a hole dug in the garden, into which the contents of the cesspool are emptied.

Scavenging.—The Local Act of Parliament empowers the Town Commissioners to enforce the cleansing of the causeways only, and their order requires this to be done twice a week, each householder being responsible for his own frontage; but no pains are taken to ensure attention to the regulation. The roadways are never cleansed, except here and there voluntarily by the inhabitants; the consequence is, that the dirty condition of the streets is remarked by every stranger, and forms a common subject of self-reproach among the townspeople. It appears from the Commissioners' books, that the scavenging has been undertaken at various times, by different persons, at a contract for £30 per annum and the manure; but the speculation has never been found to answer; and at the present time, the condition of the streets, even on a Sunday morning, bearing, as they often do, disgusting evidence of the previous night's debauchery, is disgraceful to the town.

Most of the streets of Abergavenny are flagged on one side, the main streets on both: the stone employed is that known in this neighbourhood as the Derry-stone. The flagging and the public drains and sewers are kept in repair at a contract of £28 per annum.

The roadways are paved, or *pitched*, as it is here called, with stones taken from the bed of the river;—care is not taken to select them of sufficient size. Their cheapness, and the facility with which they are procured, are reasons for their employment; but the economy is questionable. If cut blocks of hard sandstone were substituted, though the first outlay would doubtless be considerable, the ultimate expense would be less. In the year 1823, and the two following years, much attention was paid to the pitching, and many improvements were effected by the Commissioners. A contract was

then entered into, by which the streets were to be kept in repair for twenty years, at £60 per annum. This contract expired four years ago, and the pitching has not since been in good condition. Inequalities are soon worn in the principal thoroughfare, in consequence of the deficient size of the stones used.

The Town Act contains a clause, which directs that the rain water shall be conveyed from the roofs of the houses by sufficient pipes or troughs; but this enactment is very negligently enforced, and even in High-street and Cross-street, the annoyance caused by the drip in wet weather is very great, the water falling in torrents from the neglected troughs. In many cases, the troughs are made of two narrow boards jointed at an angle, often without caulking, the angular junction forming the bottom of the trough; a contrivance which very soon wears out. The neglect of the town authorities to enforce the regulation is the more reprehensible, as the constant drip of the rain water is very injurious to the flagging, by washing the mortar from between the stones.

Supply of Water.—Abergavenny has been supplied with water for many years by water-works, the town property. The minutes of the first meeting of the Commissioners, held by authority of the Local Act of Parliament, which was obtained in 1794, include resolutions referring to an estimate of the expense of replacing the old leaden pipes with iron, and to the necessity for the construction of a new pond-head. The latter work was immediately done; but the old pipes being found on inspection, in a better condition than had been supposed, were allowed to remain till the year 1806, when they were replaced by pipes of elm timber. These, within three years after they were laid down, began to leak in many places, sometimes flooding cellars, or causing other damage; iron pipes were substituted from time to time, in the different streets, as the nuisance became intolerable; but the whole of the timber was not removed till 1820, since which time no extraordinary repairs have been required. The reservoir is situated about half a mile from the town, on the course of the brook Kibby, by which it is supplied with water. It is L shaped, rather indifferently constructed, and lies in a garden exposed to contamination by decayed vegetable and other matter. It averages $4\frac{1}{2}$ feet in depth, and is capable of containing 98,800 gallons of water. The supply from the Kibby is ample, even after long drought. The top water is 17 feet 7 inches

above the highest street level, and 66 feet above the level of Lower Mill-street. The pressure is not sufficient to force the water above the ground floors. The leading main is five inches in diameter, and extends to the top of Frogmore-street; the street mains from hence to the Market-place, and to the Byfield-lane, in Tudor-street, are $2\frac{1}{2}$ inches: at these points the bore decreases half an inch. Private houses are furnished with half-inch service pipes. The parts of the town supplied, are Frogmore-street, High-street, Cross-street, and Tudor-street, and Rother and Butcher-row Wards. These streets are formed into three divisions, each of which receives water for about four hours daily, on alternate nights, and alternate Sunday nights. The water rates charged to private houses, range from 12s. to £1 per annum; the usual sum, however, is 16s. Courts are supplied by common standcocks, at rates ranging from £1. 1s. to £2. 2s., according to the number of houses. All public-houses are charged £1. Malthouses, breweries, and the larger inns, are contracted for specially. About 250 houses are supplied separately, and about 80 more by common standcocks—altogether 33 per cent. of the whole number of tenements in the town. It is difficult to calculate, with any precision, the quantity of water delivered, on account of the irregularity of the pressure. The water is clear, soft, tasteless, and inodorous. The following is the result of a careful examination of it, made at my request, by Mr. Richard Steel, of Blaenavon:—

Bases held in solution by carbonic acid.	Peroxide iron, Alumina, Lime, trifling, Magnesia, a trace,	} predominate.
Acids.	Silicic, Sulphuric, Peroxide of iron.	
Soluble Salts of	Alumina, Lime, Magnesia, Potassa, Soda,	} trifling.
With	Hydrochloric acid. Sulphuric acid, trifling.	

Water may be obtained by sinking, in nearly all parts of the town; and many houses supplied from the water-works, possess also wells and pumps, the water from which, though not so pure as the pipe water, is preferred for drinking. The Groffields, the New

Road, and other newly-built quarters, obtain their water entirely from their numerous wells. These wells average from 33 to 35 feet in depth. The following is the result of Mr. Richard Steel's examination of this water:—

Held in solution by carbonic acid.—Lime, alumina, iron, a trace.

Acids.—Sulphuric; hydrochloric, predominates.

Bases.—Lime, magnesia, alumina, iron, soda, potassa.

There are few pumps in Mill-street and Monk-street Wards; the inhabitants of these wards use water either from the Gavenny, or from public land-springs or wells. The best of these, called the Priory Well, is near St. Mary's Church. Another useful spring is situated in a lane near the Mill-street turnpike. The other two public wells are near the bottom of Tudor-street. In addition to these sources of supply, a spring of water, rising in a field near the New Hereford Road, is conducted by a gutter down one side of Monk-street to the Kibby. Little flagged reservoirs, containing six or eight gallons each, have been made here and there in the course of the gutter, to facilitate the filling of utensils. The inhabitants of Mill-street often use the water from the Mill Pond for washing, and sometimes for cooking, or for tea, without heeding the contamination of the Kibby—an instance of the repugnance to the trouble of fetching water from a distance, always exhibited by the poor.

Objections to the intermittent system of supply, and the defects of the present water-works, will be best considered when I come to the suggestion of improvements.

Ventilation.—Under this head may be included the arrangement of streets—the construction of public buildings—over-crowding of apartments, &c.

The principal thoroughfare lies irregularly in a direction nearly south and north, inclining from south-east to north-west; the majority of the other streets join this nearly at right angles. Lower Mill-street is a narrow, dirty, unflagged street, joining Upper Mill-street at a right angle, and up to this time has formed the only entrance to the town from the London road. A proposal to make a new entrance, cutting off this angle, which has been agitated from time to time for the last twenty years, is likely at length to be carried into effect. The alteration will greatly facilitate traffic; and it is to be hoped, will improve in some degree the sanitary condition of the ward. Tudor-street, which forms the most direct exit

from the town towards the iron district, runs nearly from west to east. The main thoroughfare, rather more than half a mile long, is of very irregular width in some places, as the upper end of Frogmore-street, and in part of High-street, it is so narrow as barely to afford room for the passage of two vehicles. Some of the lateral streets are also very narrow; Butcher-row, a very thickly-inhabited street, does not average more than thirteen feet between the houses. The height of the houses and the direction of these streets, are such that the lower stories do not receive the direct rays of the sun for more than an hour a day at any season of the year, and free circulation of air is impossible. The new streets in the Groffield are generally of a sufficient uniform width, and are arranged more conveniently for traffic, though even here many improvements might be effected. In the New Merthyr Road the houses are placed very irregularly; some close to the roadway, others on a high bank with gardens in front, others at intermediate distances.

The courts and alleys vary much as to their capacity for ventilation. Some, as for instance, "Wyke's-yard," though entered by narrow tunnels, are open at the opposite ends to fields and gardens; and when this advantage is not neutralized by some filthy cesspool or other nuisance, are better suited for ventilation than many of the streets. Others, especially in the older parts of the town, are mere narrow passages, entered by tunnels and closed at the farther extremity—little change can take place in air thus enclosed on every side. Even in the best and most healthy quarters of the town, the houses only open behind to a dark confined yard, where the stagnant air is contaminated by emanations from the privy, ash-bin, and sink. The houses of the outer streets generally possess back openings to gardens; but among the poorer classes, a heap of stinking refuse, close to the door, seems placed on purpose to obviate this advantage. The air admitted by the back windows and doors in Mill-street, is polluted by the odours arising from the Kibby. Houses, unprovided with any back openings whatever, are very numerous; those in courts are thus built, without a single exception. Nothing can be more prejudicial than this construction, as free ventilation by a thorough draught is thereby rendered impossible.

Few persons, even among the more intelligent classes in Abergavenny, appear to be aware of the importance to health, of large and well-constructed windows for the admission both of light and

air; and the effects of this ignorance, added to the pernicious operation of the window-tax, are seen in the insufficient lighting of the generality of second and third class houses. But the houses of the working people are still more deficient in this respect; to provide openings for the admission of enough light for the most ordinary domestic operations, appears in most instances to have been the only object of the builder. The largest bed-room windows are seldom more than three feet by two feet, and many are to be met with much smaller. The two upper rooms in Whistance's yard, before described, are provided with square 18-inch windows; but the glass is all broken, and the openings covered with rags, which are only partially removed in the day-time. In Price's-yard, the windows vary in size from two feet square to two feet by 14 inches: but much of the glass is broken and the openings are boarded up. In the upper room of a house in Traitor's-lane, with a window one foot square, I found a father and mother and six children sleeping. In Price's-yard, in a house of exactly similar description, I also found an Irish family of eight persons. This yard, inhabited by numbers of the lower Irish, was the chief seat of the epidemic fever of last summer. The ascent to the upper room is generally either by a close narrow staircase, or by a ladder through a sort of trap-hole in the floor; the little air that can enter this way is vitiated during its passage through the room below. Fire-places, if they exist in bed-rooms, are generally boarded up; and in all cases the chimney opening is so low that it affords but little facility for the escape of foul air.

The above description, however, refers only to the older part of the town. The new houses springing up in such numbers in the Groffield are much better adapted for ventilation. A back door, and a good back window on the upper floor, ensure a thorough draught. The best arranged mechanics' houses that I have seen, are near Frogmore-street turnpike. The two upper rooms open to the front, and are entered from behind by doors out of a small passage, aired and lighted by a convenient back window. The sashes of the bed-room windows slide horizontally—a better and cheaper form of construction than the vertical sash. In some respects, however, these tenements are objectionable; the privies are too near the back doors, and the situation is low and without drainage.

The rents of mechanics' houses vary considerably; as a general rule, the worse the house the higher the proportional rent. Two shillings a week is paid for the miserable tenement of two rooms, 12 feet square, in Traitor's lane, which I have before mentioned. The houses in Price's-yard are let by the mortgagee of the property at one shilling per week each; and the owner charges one shilling more for a miserable bedstead and table, scarcely worth the week's rent. One shilling and sixpence, one shilling and ninepence, and two shillings, or more, are paid per week for two-roomed houses in other courts. The rents of comfortable mechanics' houses in the Groffield, with a good living room and small back kitchen on the ground floor, and two good bed-rooms, vary from £6. to £6. 10s. per annum.

Public Buildings.—There are no public buildings in Abergavenny that call for much observation. The Parish Church is very lofty, light, and airy. The part in which Divine service is performed, is of modern erection, and is tolerably well provided with stoves. In winter, the ancient portion of the church, which acts as a great reservoir of cold air, is screened off by a curtain. Sufficient care, however, is not taken by the sexton to draw the curtain in cold weather, nor are the stoves lighted long enough before the commencement of Divine service, to warm the church effectually. Trinity Church, a stone building, recently erected by the munificence of a private individual, is objectionable only from its extreme coldness in winter. It contains no heating apparatus whatever, although much frequented by the aged poor, and by children, whose deficient animal heat requires to be artificially sustained during the long stillness of the services. The Dissenting Chapels are all liable to a similar objection. The Cymreigyddion Hall, a large irregular room, with small windows and fire-places, is nevertheless airy enough for the various purposes for which it is employed. The Town Hall presents no salient point of objection. The Gate, or Lock-up, is a small stone building in Monk-street; the Kibby runs directly beneath the pavement. It is close and liable to damp, and the separate cells are much too small, and would exercise a very pernicious effect upon the health of prisoners long confined in them; but as they are seldom tenanted for more than a few days at a time, no ill consequences have hitherto been observed.

School-rooms.—Most of the public school-rooms are well built

and well ventilated, and have decent privies attached to them. The National School is held in a low and rather dark room, under the Cymreigyddion Hall, warmed, but not effectually, by a single small fire-place. It is expected, however, that this place will ere long be superseded by a new building which it is proposed to erect for the purpose. The Church of England Girls' School, which has been established about two years, is now held in a small low apartment, badly lighted and ventilated, and every way unfit for an assemblage of children for several hours daily. It is feared the difficulty of procuring a proper place in which to hold this school, will shortly lead to its abandonment. None of the public schools, except the Free Grammar School, have play-grounds attached; but the want of them is not felt, as the children return home as soon as they separate. The efficiency of their heating apparatus is the only doubtful question of importance regarding the other school-rooms. As a general rule, means for ensuring a complete and equable distribution of heat are not, I think, sufficiently attended to in the construction of school buildings.

Workshops.—Few workshops are large or important enough to require notice, as most in-door work, except that of carpenters, whitesmiths, &c., is done by the journeymen in their own houses. Shoemakers, who are very numerous, and tailors, nearly always take their work home.

Bathing.—The facilities afforded for the healthful practice of bathing, by the proximity of the beautiful river Usk, are taken ample advantage of in the summer, by the younger male population. Nor has any fatal accident resulted from the custom during the last ten years, though several have occurred from the upsetting of boats. The elder males, however, and the women of the working classes, have no means of procuring water for thorough ablutions, except with more trouble than they are willing to undergo.

Lodging-Houses.—Houses for the reception of tramps and poor travellers are numerous in Abergavenny, and their sanitary condition forms no exception to what is generally observed in these pest places in all other towns, though some of them are much better than others. The rooms are low, small, and ill-ventilated. I have seen in one of the best, seven beds contained in two small rooms, with only one window, two feet by one foot, that would open, while the fire-place was boarded up. They are subject to no restrictions as

to the number of persons received, which is only limited by the area of the floor. The head policeman informs me that he has seen more than twenty persons in a small house of two rooms, the lower room so close as to be scarcely endurable, while the breath of the inmates might be seen issuing in steam from the open door. All ages and both sexes lie together indiscriminately. The women of the class using the lowest of these houses are seldom married, nor even remain long in the company of any one man; they are common to all their male acquaintances, and accompany one for a journey or two, and leave him for another. Fever and illness of all kinds are very prevalent in these places. The charge per night is generally 3d. for each person. Sometimes a family is taken in for a stay of some nights, at a smaller sum.

Nuisances.—Many crying nuisances, such as cesspools, dung-heaps, &c., have been already mentioned incidentally; others remain, which are more especially sources of public annoyance. One of these is the small attendant on the melting of tallow for making candles, which are largely required for use in the mining districts. The tallow chandlers each melt about once a week; and in summer, when the tallow is putrid, the smell is very diffusive and extremely disagreeable. Invalids always complain very much of this nuisance; and I have known one lady who suffered from nausea and loss of appetite whenever the process was going on.

There are two tan-yards in Mill-street, which, of course, impregnate the air with the odours incidental to the manufacture of leather. The smell of tan is not, perhaps, in itself injurious to health, and to many persons it is not disagreeable, but the earlier processes in the preparation of leather are often offensive. The smell from the skin-yards in Mill-street, especially from heaps of the horns and hoofs left till they putrify, cannot be innocuous.

Many places, not constructed for slaughter-houses, as stables and outhouses, are nevertheless used for that purpose. They therefore afford no facilities for cleanliness, and are often much neglected. A very filthy slaughter-house and yard behind the Market-place has been already mentioned. A stable in Castle-street, used as a slaughter-house, is a great public offence. Blood and urine constantly flow from it, by an imperfectly covered drain, to the gutter in the street. A reverend gentleman, whose house is close to this place, has been subject to most serious annoyance from maggots

crawling under the door into the street, and thence into his house, in such numbers, that his servants have removed them with a shovel. The smell was so intolerable, that he and his family were often unable to take their meals from disgust. This state of things was partially remedied last summer by an order of the magistrates, that the place should be kept cleaner; but it is still very offensive, and the street gutter may often be seen flowing with mingled blood and urine. The family next door complain that they are often disturbed, at four or five o'clock in the morning, by the noise of knocking down beasts. The slaughter-houses in Tudor-street are often offensive to the passers by, and must be injurious to the health of the neighbouring houses.

The frequently-filthy state of the Mill Pond, in Mill-street, has been already adverted to.

The burial-ground of St. Mary's Church has long been so crowded, that it is difficult to find a spot where a grave may be dug, without interfering with remains not yet decomposed; and it is not uncommon for the grave-diggers to meet with fragments which exhale a horrible stench after exposure to the air. Only one or two houses are close to this ground, and it is surrounded by a double row of lime trees, by which it is fenced from public observation, so that its crowded state has hitherto attracted little notice. Burial-grounds are attached to several of the Dissenting Chapels, but at present none of them are over filled.

Gas.—Works for the supply of Abergavenny with gas were erected in 1823 by a private individual. A contract entered into between this gentleman and the then Commissioners, accords to the former, permission to take up the public pavements at any time, either for the purpose of laying gas pipes, or for necessary repairs, and guarantees that similar permission shall not be granted to any other person for the term of 1000 years, on condition of the town being supplied with gas, gratis, for twenty public lights, and with what additional quantity might at any time be required, at £2 per light per annum; the lights to be placed in whatever part of the town the Commissioners might think fit, and to be lighted from sunset to sunrise, from the first of October to the first of May in each year, except on the night of the full moon, and the two nights preceding and two succeeding it, in each month: the works to be forfeited to the Commissioners, in case of neglect to fulfil any condition of the

contract, after one month's notice given by them of such neglect. This contract was fulfilled till within the last three or four years; since which time, in consequence, probably, of the works not being capable of producing the increased quantity of gas consumed, the lamps in Mill-street and the low parts of the town farthest from the works, cannot be lighted till after nine o'clock, when the shops are closed. This is considered a breach of the contract, and has given rise to much discussion between the Commissioners and the present proprietor. The Commissioners, and the inhabitants generally, complain, and with reason, both of the price and quality of the gas; and the penalties for the breach of contract are urged to induce the proprietor to lower the price. This done, the Commissioners would doubtless accede to the proposal already made to light Mill-street with oil; or would even leave it in darkness, since the new thoroughfare about to be made will obviate the Post-Office objections to its obscurity. In order to oblige the proprietor to come to terms, all the public lights (forty in number), except the twenty supplied gratis, have been extinguished; and it is probable that many of the largest consumers, most of whom are Commissioners, will give up the use of gas in their shops and houses. At present, gas is burned in all the best shops, and in the halls and kitchens of many private individuals. In some shops, argand burners are used, but ordinary fish-tail or fan burners are more common. The gas delivered is impure, and makes much smoke. No contrivance is employed to carry off the injurious products of the combustion.

The Abergavenny Gas Works were erected under the direction of a Mr. Broadmeadow, who obtained a patent for a peculiar method of purifying gas, in which the intermixture with it, of a certain portion of atmospheric air, was a leading feature: the gas also was generated in brick ovens instead of the usual iron retorts. The plan, however, did not answer the expectations of the inventor, and the common process was substituted for it. This abortive experiment, and the careless manner in which the pipes were jointed when first laid down, necessitating, after a short time, a re-examination of the whole series, were doubtless the causes of great expense to the proprietor, and obliged him to charge very highly for the supply of gas. The present price is £2. 8s. per annum for small burners; for large bat's-wing burners, £3. 5s. is charged. Meters are not used; a proposal to introduce them was made last

year by the proprietor, but subsequently retracted without cause assigned.

Charitable Institutions.—The Abergavenny Dispensary, for affording out-door medical relief to the poor of the town and neighbourhood, is supported by voluntary contributions. There are three medical officers; one of whom attends to prescribe for patients, at eleven o'clock A.M. every day, except Tuesdays and Sundays. The average number of patients relieved annually, during the last five years, was 665, nearly three-fourths of whom were resident in the town. Of 829 patients entered under the care of two of the medical officers, during the years 1845-46, 241 were males and 410 females above the age of 12 years, and of the average ages of 33 and 35 respectively; the remaining 190 were children under 12 years old. The class of patients differs from that of paupers relieved by the medical officer of the Union; these amounted, in the parish of Abergavenny, during the same two years, to 47 males and 66 females of the average ages of 50 and 51 years, and 11 children under 12 years. The small number of children relieved in proportion to the mortality, is accounted for by the number of infant deaths caused suddenly by convulsions, or by debility shortly after birth, as well as by the ignorance of the lower classes of the importance of the first symptoms of illness in children, and their consequent neglect.

This deserving charity is not well supported by the inhabitants of the town. The annual subscriptions do not average more than £85, a sum scarcely sufficient to supply the necessary medicines.

There are several charities for supplying the poor with clothing. The Ladies' Charity, for providing blankets and other comforts for aged and infirm women, has long been useful.

The children attending certain schools are clothed by a weekly subscription required from each child, to which a sum from the funds of the school is added at the end of the year.

A General Clothing Club has also been lately established. It is well supported, and promises to be of great utility.

Epidemics and Prevalent Diseases.—The most common diseases fatal to life in Abergavenny, are consumption, typhus and typhoid fevers, rheumatic fever and its sequelæ, the exanthemata or eruptive fevers, and the various scrofulous and other diseases of children which cause death by convulsions, and diseases of the chest.

The greatest mortality among adults is due to consumption, among children to convulsions, the exanthemata, and diseases of the chest. The facts most worthy of notice concerning the mortality occasioned by these diseases, have been arranged, for the sake of brevity, in the following tabular form :—

TABLE VII.*

	ABERGAVENNY.			
	Total deaths in ten years.	Per cent. to total deaths from all causes.	Total under five years.	Greatest number in one year.
Small Pox	49	4.3	41	39 in 37-38
Scarlatina	57	5.07	41	36 in 43-44
Typhus	56	4.98	26	13 in 42-43
Consumption	172	15.4	31	
Convulsions & Teething	95	8.4		
	RURAL PARISHES.			
	Total deaths in ten years.	Per cent. to total deaths from all causes.	Total under five years.	Greatest number in one year.
Small Pox	18	2.8	8	14 in 37-38
Scarlatina	36	5.6	25	17 in 43-44
Typhus	20	3.1	20	7 in 39-40
Consumption	92	15.3	31	
Convulsions & Teething	48	7.5		

* Deaths by violence have been excluded from all calculations of proportional mortality contained in this and the subsequent tables.

It will be seen from this table, that the proportion of deaths from infectious diseases is much greater in the town than in the rural parishes; nor is this attributable solely to the greater density of the population, but rather to the defective sanitary arrangements, as will be shewn by subsequent tables. Typhus is seldom absent from the town and neighbourhood; it is nearly confined to the dirtiest and closest streets and alleys. The disease frequently takes a mild form, is not very fatal, nor often characterised by petechiæ, rubeloid eruptions, nor the extreme cerebral oppression so constant in London and Liverpool; nevertheless, numerous cases are met with marked by all the symptoms of the most fatal forms. Certain localities in the rural districts are very subject to typhus. I have seen several cases, at various times, in a marshy dingle about a mile above Rhydymeirch, in the parish of Llanover; the fields around are undrained, and are always damp and boggy. The proportion per cent. of deaths due to consumption in adults, and to convulsions, and teething in children, is nearly equal in the two districts, though, as the table shows, the relative absolute mortality from these causes follows the general rule. The number of deaths of newly-born infants attributed to debility, is much greater in the town than in the rural district. The prejudicial effect of the impure air by which they are surrounded, upon the health of the mothers, is probably one great cause of this. Rheumatic fever, with its sequelæ, though frequent here, as in all other places, is not so virulent nor so fatal as in London and its neighbourhood, the only locality with which my experience renders me familiar. The dryness of the soil, and the mild climate, probably contribute to this advantage. The registry affords no means of ascertaining the exact mortality caused by rheumatic fever, as the varieties of dropsy are not distinguished.

It is doubtless sufficiently evident that the above report of the defective condition of sanitary arrangements in Abergavenny, fully accounts for the high rate of mortality exhibited in the tables previously given. I shall now proceed to examine the mortality in each ward, with the view of showing within how narrow limits the connexion of cause and effect, now stated, may be traced. The relative condition of the sanitary arrangements in the different wards will have appeared from previous incidental observations. The following additional particulars will put the reader in possession of sufficient information respecting each, to enable him to appreciate the value of the subsequent tables.

High-street and Cross-street Wards form the leading streets, and are inhabited almost entirely by well-to-do tradesmen : many of the houses have gardens or open spaces behind, especially those in Cross-street. This latter street has also a good fall, and is broad and open ; High-street is more confined. Butcher-row Ward, though the residence of many respectable tradesmen, is close and narrow ; the houses are badly built, with, at best, only small yards behind them ; they are ill supplied with sewerage and other means of removing refuse. Flannel-street, the chief street in this ward, abounds with butchers' shops. Rother Ward adjoins Butcher-row, but in most respects it is better situated for health ; the houses on one side the main street are good, and open behind to gardens. A small part only of this ward is inhabited by poor people, but this part is very defective. Frogmore Ward is the largest in the town, and a very considerable proportion of the houses it now contains have been built within the last ten years, and these are chiefly occupied by respectable mechanics and others of the working class ; most of them, though still defective, are better than the generality of mechanics' houses in the older part of the town. Frogmore-street itself contains many houses of the worst description. The site of this ward is partly level and partly sloping ; it has a western aspect, and is generally tolerably dry. The recently-built houses have no water except what is obtained from wells. Monk-street Ward, which includes Ireland-street, is of a very mixed character ; it contains many good and well-built houses, well situated for water, which form the main-street ; but it also includes some of the worst and dirtiest lanes and alleys in the town, inhabited by prostitutes and others of the most depraved class. Mill and Tudor Wards, at opposite extremities of the town, are both inhabited almost exclusively by working people. The sanitary condition of Mill-street is decidedly the worst ; it is situated on the low, flat, and rather damp ground beneath the Castle-hill, with an eastern aspect, very deficient sewerage, ill supplied with water, and the air contaminated by the Kibby and various other nuisances. Tudor Ward, though dirty, ill-built, and unsewered, has the advantages of a western aspect, sloping ground, and a main from the water-works. The following table may be considered in connexion with the above statement :—

TABLE VIII.

	Rateable value of each Ward.			Assessed Taxes.			Number of Houses.	Number of Houses paying Window Tax.	Number of Windows paid for.	Per centage of Houses paying the Tax.
	£	s.	d.	£	s.	d.				
Frogmore Ward	3783	0	0	393	14	6	306	62	820	20.3
Rother Ward	931	10	0	151	7	11	38	19	301	50
High-street Ward	1154	0	0	122	9	8	51	16	257	31.3
Cross-street Ward	2115	0	0	215	14	3	66	35	512	53
Butcher-row Ward	1017	10	0	78	11	0	69	12	146	17.3
Tudor Ward	1351	10	0	79	17	0	155	10	113	6.4
Mill-street Ward	953	10	0	41	16	10	125	8	99	6.4
Monk-street Ward	1446	10	0	129	13	8	150	22	328	14.6
Hamlets and Suburbs	7406	10	0				89			
Total	18,712	10	0	1213	4	8	1049	184	2576	19.1

This table affords, at one glance, a more accurate indication than could otherwise be given, of the wealth and poverty, and generally speaking, of the relative sanitary arrangements in each ward. It must be remarked, however, that in small towns like Abergaveenny, misery and comfort are often very near neighbours; and accordingly, the best wards contain some few dwellings distinguished by filth and squalor. Cross-street Ward, for instance, includes the block of houses in Traitor's-lane, formerly described, by which its rate of sickness and mortality is considerable affected.

The next table is a statement of the mortality in each ward:—

TABLE IX.

	Frogmore Ward.				Rother Ward.				High-st. Ward.				Cross-st. Ward.				Butcher-row W.			
	Under 5 years.	5 and under 20.	20 and under 60.	60 & under 100.	Under 5 years.	5 and under 20.	20 and under 60.	60 & under 100.	Under 5 years.	5 and under 20.	20 and under 60.	60 & under 100.	Under 5 years.	5 and under 20.	20 and under 60.	60 & under 100.	Under 5 years.	5 and under 20.	20 and under 60.	60 & under 100.
37-38	10	3	4	4	4	2	3	0	0	0	0	0	4	1	4	2	1	1	2	2
38-39	7	0	3	3	3	0	0	1	0	0	2	1	2	0	3	2	3	1	2	2
39-40	8	2	10	4	4	0	0	1	4	0	1	1	2	3	3	2	4	0	2	4
40-41	9	5	5	5	2	0	1	3	3	0	0	2	4	0	3	2	7	1	2	1
41-42	19	6	9	6	2	1	3	0	1	2	0	2	1	2	2	1	2	1	3	3
42-43	13	4	12	9	0	1	1	0	2	0	0	1	0	0	1	1	3	1	0	1
43-44	16	8	10	4	1	1	1	1	1	0	2	2	3	0	1	0	4	0	1	1
44-45	13	1	4	8	0	0	0	0	0	0	3	1	0	1	1	3	3	0	1	1
45-46	7	0	5	4	1	0	1	1	1	1	2	2	3	1	1	3	0	0	2	2
46-47	9	1	14	8	2	1	1	0	0	2	1	3	0	0	5	1	1	0	5	1
Total.	111	30	76	55	16	6	10	8	8	8	11	15	19	9	28	16	32	5	23	17
Total.	272				40				42				72				77			
	Tudor Ward.				Mill-st. Ward.				Monk-st. Ward.				Hamlets and Suburbs.				Doubtful.			
	Under 5 years.	5 and under 20.	20 and under 60.	60 & under 100.	Under 5 years.	5 and under 20.	20 and under 60.	60 & under 100.	Under 5 years.	5 and under 20.	20 and under 60.	60 & under 100.	Under 5 years.	5 and under 20.	20 and under 60.	60 & under 100.				
37-38	9	1	4	3	11	2	6	2	8	5	1	6	4	2	3	1	1			
38-39	7	1	6	4	6	4	4	2	7	2	2	4	0	0	1	2				
39-40	8	2	4	3	14	2	2	7	10	3	10	6	0	1	2	2	1			
40-41	6	0	3	0	14	6	11	6	8	1	12	3	2	0	0	1				
41-42	9	1	7	5	13	2	4	3	13	3	4	4	4	0	0	0	2			
42-43	5	4	2	3	7	5	5	8	5	0	3	6	2	0	1	1				
43-44	6	2	5	7	10	2	5	4	7	3	3	7	1	0	2	2	3			
44-45	4	1	2	5	5	3	1	5	6	0	3	1	2	0	2	2				
45-46	3	0	3	6	8	2	3	3	3	2	2	2	1	1	1	2	0			
46-47	6	0	6	5	4	1	4	4	4	1	7	5	1	0	3	1				
Total.	63	12	42	40	92	28	45	39	71	20	47	44	17	5	16	27	12			
Total.	157				204				182				65							

The following statement of the population of the wards in 1841 is not quite satisfactory, but it is the only one I have been able to obtain:—

TABLE X.

Tudor Ward	819
Monk-street	893
Mill and Cross-streets	1008
Frogmore Ward	978
High-street, Rother, Butcher-row, and the Hamlets ..	1256
Total.....	4953

In Frogmore Ward; in consequence of the number of new houses, a great increase must have taken place since 1841. The population of Mill-street Ward is probably considerably less than that of Tudor-street.

As the sanitary condition of any locality is perhaps best indicated by the proportion which the infant mortality bears to that of the adult population, I have reduced the results of Table IX. to a percentage, to facilitate the comparison between them. The proportion of deaths to houses is also given.

TABLE XI.

	Deaths per cent. under 5 years to total deaths	Average deaths per house in 10 years.
Frogmore..	40.8	0.88
Rother	40.0	1.05
High-street.	19.0	0.82
Cross-street.	26.3	1.09
Butcher-row	41.5	1.11
Tudor	40.0	1.01
Mill-street ..	45.0	1.63
Monk-street	39.0	1.21
Hamlets ..	26.1	0.73

These results, of course, are not to be considered as affording an exact indication of the chances of life in each ward, as the facts are too few, especially in the smaller wards, to escape the influence of accident. The high infant mortality in Rother Ward is due to the virulence with which the small pox attacked the children in two or three small houses in 1837.

That in Frogmore Ward to the scarlatina of 1843-44.* The other figures present a tolerably accurate indication: High-street, Cross-street, and the Hamlets, on one hand, and Tudor-street, Mill-street, Monk-street, and Butcher-row, on the other, are very remarkably contrasted. The general results of the first column are confirmed by the second, especially in the case of Mill-street, although nearly all the houses in that ward are very small.

The next table has been constructed from the books of the Dispensary; it exhibits the number of cases which occurred in each ward, under the care of two of the medical officers, in the years 1845 and 1846. These two years were chosen at random; the number of cases is below the usual average.

* The number of infant deaths is given in the third column of Table VII.

TABLE XII.

Frogmore	102
Rother	9
High-street	2
Cross-street	15
Butcher-row	40
Tudor	104
Mill-street	168
Monk-street	142
	573

The total number of patients relieved in these two years, was 1948; the residence of 217 of these is not recorded, the remaining 238 were residents out of the town. The table doubtless affords a more absolute criterion of the poverty than of the health of each ward; but examined in connexion with Tables VIII. and X., its value, in a sanitary point of view, will become apparent. It strongly confirms the previous evidence of the unhealthy state of Mill-street and other parts of the town, where the conditions necessary for health, which were formerly enumerated, are most deficient. The last table I have to submit exhibits the mortality by typhus and the three most fatal exanthemata in each ward.

TABLE XIII.

	Small Pox.	Scarlatina.	Measles.	Typhus.	Total.
Frogmore	6	20	4	10	40
Rother	4	3	0	0	7
High-street ..	0	1	0	1	2
Cross-street ..	3	2	2	5*	12
Butcher-row ..	0	1	0	3	4
Tudor	9	11	1	9	30
Mill-street....	12	7	6	13	38
Monk-street ..	11	7	0	13	31
Hamlets	4	4	0	2	10

This table, like all others compiled from a small number of facts, is subject to slight apparent inconsistencies. For instance, the mortality in Butcher-row Ward is less than might be expected from the closeness of the houses and the deficiency of means for removing refuse; but in the main, the results coincide very remarkably with

* Two of these cases occurred in Traitor's-lane.

preceding statements. The typhus column, in particular, exhibits, with great accuracy, the law of prevalence universally obeyed by that disease.

It is proper to say in this place, that I am far from contending, that if the sanitary condition of all parts was equally good, the rate of infant mortality would not still be higher in poor than in wealthy quarters, as the neglect of their offspring often displayed by the uneducated, the extremely injudicious diet they employ, and insufficient clothing, are no doubt fatal to great numbers of the children of the poorer classes; so also must exposure and privation increase the mortality of adults. But that these causes are alone sufficient, as some persons imagine, to account for the high rate of mortality in the town, is disproved by a multitude of circumstances, in addition to the evidence already laid before the reader. The rural parishes with which Abergavenny has been compared, are inhabited almost entirely by a race of small farmers and their labourers, exposed, in consequence of the nature of their employment, to all the vicissitudes of weather, residing, many of them, in dilapidated cottages, and at a much greater distance from medical relief than the town population. An accurate idea of the comparative poverty of the two districts may be derived from the amount of parish relief administered in each. The average sum expended per annum, during the four years ending March 1847, was, in the parish of Abergavenny, £1014; in the rural parishes, £1967. Other details to a similar effect might be quoted from the Union returns, but farther proof is unnecessary.

From a review of the statements contained in the above report, the following summary of conclusions may be formed:—

1st. That the climate, soil, and situation of Abergavenny are favourable to health and longevity.

2nd. That the population, generally speaking, is not engaged in unhealthy employments.

3rd. That the rate of mortality in Abergavenny is high in comparison with that of many other towns less favourably circumstanced.

4th. That the mortality of Abergavenny being compared with that of the neighbouring rural parishes, it appears—

1st. That the annual proportion of deaths to the population, is much greater in the urban than in the rural district.

2nd. That the proportion of infant, to the total mortality, is also much greater.

3rd. That the proportion of deaths above the age of sixty years is much less.

5th. That many of the courts and alleys in Abergavenny are in a filthy and disgusting condition, and unfit for the residence of human beings; that the drainage and sewerage of the town is very imperfect, and the brook forming the main sewer totally unfit, in its present state, for the use to which it is applied; that privies and receptacles for refuse are insufficient in number for the population, badly situated, and of the worst possible construction; that in the absence of any regular provision for scavenging, the surfaces of the streets are generally dirty and unswept; that many of the streets are close and narrow; that the houses, of the lower classes especially, are badly arranged, and built without sufficient regard to lighting and ventilation; that various nuisances detrimental to health are permitted; that lodging-houses, and other dwellings of the poor, are ill regulated and liable to overcrowding; that the supplies of water and of gas are defective: and

6th. That to these causes the high rate of mortality in Abergavenny is to be attributed.

7th. That this conclusion is confirmed by the fact, proved by numerous tables, that the rate of mortality is highest, and disease most prevalent, in those wards of the town in which the defective arrangements above recited are most conspicuous.

8th. That though such wards are inhabited chiefly by the poor, the privations caused by poverty are not alone sufficient to account for the high rate of their mortality.

REMEDIAL SUGGESTIONS.

I shall now proceed to point out the means by which the defective sanitary arrangements in Abergavenny may be improved, and what immense economy, both of life and money, would result from such improvements. The suggestions I have to make are founded almost entirely upon the reports of evidence taken before the Health of Towns Commission, and upon Mr. Chadwick's Report on the Sanitary Condition of Great Britain.

Drainage and Sewerage.—The evils attendant upon the use of cesspools among the lower classes, as receptacles for the filth of privies, have been already pointed out; the unwholesome influence of such places does not require elaborate proof. Nor is there any doubt that those used by the rich, although better constructed, more carefully concealed and more frequently cleaned, exercise, in all cases, a highly pernicious effect upon health. The languor, the oppression, the frequent derangement of the digestive organs, and many other ailments to which the inhabitants of towns are so liable, have been proved by careful observation, to be in great measure due to the unperceived emanations which arise from these and other similar offences. The first step, therefore, to improvement in the sanitary condition of a town, is to replace these nuisances by an efficient system of water-closets, connected everywhere with well-constructed sewers; and abundant evidence has been received to show that this important change may be effected at a rate which will not add materially to the rent of the humblest class of dwellings.

The forms and modes of construction of sewers, recommended by witnesses to her Majesty's Commission, are various. There seems no doubt that the best form is the egg-shaped, the narrower part being placed downwards. In this form, water acts the most powerfully in carrying away refuse; it is moreover cheaper than any other. It should be built with radiated bricks, which possess the advantage that the sewer constructed with them is equally solid in all parts; whereas, when common bricks are employed, the interstices between them, at the circumference of the sewer, are very considerable, and must be filled up with mortar, or some loose material, which soon crumbles. In London, these bricks cost 40s. per thousand, or 8s. more than common bricks. In this place they would probably not be obtained under 50s. per thousand.

Another apparently excellent method of constructing sewers was proposed by the late Mr. D. Guthrie. Pieces of fire clay are moulded in such a shape, that three of them, put together, form the whole circumference of the sewer. Side drains are connected by means of holes left in the side pieces of the clay at the time of their manufacture. Mr. Guthrie states that a sewer, 8 feet 6 inches in height, and 2 feet 6 inches in width, can be made by this plan at the rate of 18s. or 20s. per yard. This size, however, is larger than can be

required in any street in Abergavenny. Round 18-inch drain tubes, which may be obtained at 2s. per yard, are sufficient for the drainage of streets of thirty or forty houses. Sewers of this kind possess the advantages, besides their intrinsic cheapness, that they are laid down in a shorter time, and at a less expense than brick drains; from their smoothness, they require less fall, and are more easily flushed, and are never infested by rats, which do immense damage to common drains. A third form of sewer, used by Mr. Hugh Biers, an extensive London builder, is built of common bricks, and has upright sides and an angular invert, the top being formed by a flat stone. This is somewhat similar to the Flannel-street and other drains in this town; but the angular invert, constructed according to Mr. Biers' plan, obviates the objection that some portion of the circumference of the drain, when built round with common brick, is of mortar, against which he expresses himself very strongly. A sewer of this construction, two feet square, costs in London, at 6 feet depth of digging, 7s. per foot. This size would be ample for most streets in Abergavenny. Diagrams of other smaller, but similar forms, accompany the report of Mr. Biers' evidence.

Efficient house drains are equally important with good sewerage, both for health and convenience; and in this respect, houses in Abergavenny, nearly without exception, are miserably defective; common square drains of the worst construction, untrapped, liable to constant obstruction and escape of the foul air they contain, infested by rats, and leading almost invariably into cesspools, are everywhere adopted. The plan of house drainage proposed by Mr. Dyce Guthrie, and approved of by all the most intelligent witnesses examined by the Commission, is so efficient in practice, and so consonant with every principle of hydraulics, that there can be no doubt of its superiority to any other. He considered that not only the form, but the size of the usual house drains is bad, inasmuch as they are too large for water to act with its full force in flushing and cleansing them. He therefore proposed the use of glazed tile tubes, either of common clay or of *terra cotta*, not more than three inches in diameter for any ordinary dwelling; and he gave diagrams exhibiting plans for flushing such drains with water, either collected from the roofs of houses or supplied from water-works. Tubes of *terra cotta*, 1 foot 6 inches in length, and from 3 inches to 18 inches in dia-

meter, may be obtained at from 8d. to 7s. 6d. Clay, 2 feet lengths, from 3 to 12 inches in diameter, at from 6d. to 1s. 6d. Stoneware pipes, or those called *terro-métallée*, made in Staffordshire from a peculiar clay containing a large proportion of iron, are sold at similar prices.*

The next great object is to find some good and cheap plan for providing small tenements with water-closets, and so to do away with the necessity for the filthy privies and cesspools. Several gentlemen, who have turned their attention to this subject, laid before the Commission, plans for effecting this object. An excellent, simply-constructed, torrent-water-closet, self-acting (a highly-important point for the poor), has been invented by Mr. H. Austin, architect. It may be fixed, complete, supposing the drain already made and water laid on, at 50s. Mr. S. O. Foden, the architect of the Rye and Aylesbury Unions, and of other public buildings, has employed in those places, soil-pans, of much simpler construction than the common water-closet, and which can be fixed at a very low price. An extremely neat form, enclosed in a box with two lids, which lift up and allow the pan to be used as a sink, he considers the best for common tenements. If many of these were used, the price would be from 25s. to 30s. each, including fixing. He also states, in the course of his evidence, that a bricklayer in Clerkenwell proposes "to find a useful soil-pan, to fix it complete, and connect it with a drain, in any old tenement in any part of London, for £1. each, privy superseded." A single pan of this kind has been found to answer admirably, in a house let out in lodgings to several families of the working class. Excellent stoneware soil-pans are made by Doulton and Watts, of Lambeth, at 7s. 6d. each.

But the improvement in the public health which might be expected from the increase of these comforts and conveniences in dwelling-houses, would be in a great measure neutralized, if the brook Kibby, the main sewer of the town, were both to retain its its present function, and to continue the same open, unwholesome, stinking ditch that it now is. All that part of it within the town

* The principles of drainage and sewerage advocated by Mr. Guthrie, have attracted great attention from parties engaged in these operations, and the advantages resulting from them are becoming daily more and more apparent; so that there is every reason to expect that in a very few years, the huge, expensive brick sewers hitherto built, will be replaced by smaller and more efficient structures of fire clay.

should be converted into an efficient brick-covered sewer. This, however, could not be done under an outlay of £500; and though it might be shewn that this sum could not be more usefully nor more profitably expended than in getting rid of a nuisance so detrimental to health, whose noxious effects, though their operation is unseen, and their cause unsuspected by the sufferers, are not the less certain; yet, from the general ignorance of the public of the importance of sanitary reform, and the consequent opposition encountered by any proposal involving expenditure without the prospect of an immediate and tangible return, it would be vain to expect, at present, the application of such a sum of money to this purpose. I would suggest, as the next best expedient, to line the bottom of the water-course either with a curved invert of brick, or an angular one of flat stones, so that the water might act with facility in keeping it clear, even in very dry weather. The principal of the sum annually paid by the Commissioners for cleaning the brook, would nearly suffice for this improvement. The money might be raised by a very moderate rate in a short term of years.

It has been mentioned that the gully drains, in consequence of the injudicious plan on which they are constructed, frequently become choked up with refuse, and in this state emit disgusting odours: even when free, if they communicate with sewers, they are always liable to the latter objection. Both gratings and drains are generally much larger than is necessary to carry off the surface water. The tendency to choke up may be remedied by very slight improvements in their construction. Mr. D. Gathrie proposed that the gully-drain should always form an inclined plane from the surface of the street to the sewer, so that refuse could never accumulate, as it now does, at the bottom of a perpendicular shaft. The drain may be readily formed, without the expense and inconvenience of taking up the pavement, by boring, and lining it with drain tube. Being straight, instead of angular or curved, it can be very readily cleaned by passing a rod through it. Gully-drains of this kind should be trapped at their entrance into the sewer. These at present in use in this town should be trapped with a hinge-flap; for a delineation of which, I refer to the tract on Drainage published by the London Working Classes Association for the Improvement of Public Health. This trap, besides obviating the stench of refuse

and of putrid water from the gully-hole, acts as a sort of flushing apparatus, and prevents the drain from choking up.

Scavenging.—The Abergavenny Town Act does not empower the Commissioners to enforce the cleansing of the roadways by the inhabitants; and although several individuals have at different times engaged to sweep the streets at a contract for £30. per annum with the manure, the undertaking has not yet been found to answer by any person; and in consequence, the dirty streets of Abergavenny have become notorious. Nor must it be supposed that the public health can escape suffering from the constant depressing effect of emanations from refuse left exposed for days together in the open streets. This state of things might, I think, be remedied by the introduction of Mr. Whitworth's street-sweeping machine. This gentleman, in describing the principle of his machine, says, that the ordinary operation of scavenging consists of three different processes—sweeping together, carting, and carrying away—which involve a large amount of protracted labour. By means of the machine, these three processes are combined and carried on at the same moment, without human labour beyond that of driving the machine; and obviating the waste of horse power occasioned, both by the cart standing still, or moving a few paces only at a time during loading, and by its journey to and from the place of deposit to the immediate scene of operation. Space does not permit me to give a detailed account of all the advantages possessed by the machine, for which I can only refer to Mr. Whitworth's evidence, published in the Report of the Health of Towns Commission. It must suffice to state, that the machine when in action, the horse going at the rate of only $2\frac{1}{2}$ miles per hour, sweeps in that time 4000 square yards, or nearly the day's work of four men; and that the township of Manchester is now swept by Mr. Whitworth, twice as often, and more effectually, than it was done under the old system, at an actual saving to the town of £500. per annum. The Street-Sweeping Company undertakes to furnish the machine complete at £110. for four years, £6. extra being charged for every additional set of brushes required beyond the set first provided. The sum of £30. per annum, which the Commissioners have already evinced their willingness to expend in scavenging, would pay for the machine; and there can be little doubt that the value of the manure collected would cover the expense of working it. The pre-

sent condition of the streets is so disgraceful, that the experiment is, at all events, well worth trying, as the resulting loss, if any, could be but trifling.

Mr. Whitworth, in his evidence, insists very strongly on the advantages of the recommendation of Telford, that there should be no gutter or other channel in a street but that "formed by the angle made by the surface of the pitching abutting on the kerbstone." This form of channel is more easily cleaned than any other, affords as free a flow to water, and a greater extent of even roadway. Nearly all the gutters in Abergavenny are formed by the "objectionable method of the road being elevated towards the kerbstone, so as to form the gutter with the curve of the road."

But water furnishes a method of street-cleaning, cheaper and more effectual than any scavenging operation. In this case, all refuse being carried off by the sewers, a very abundant supply of water is necessary. I shall now proceed to consider the best method of affording such a supply to the town, since without it, most of the improvements already suggested would be nearly impracticable.

Supply of Water.—It has been already shewn, that although Abergavenny possesses great natural advantages in this respect, in its numerous surface springs, and in the certainty of obtaining water in any part of the town by digging; yet that the well-water is hard, containing salts in quantities, which render it unfit for many household uses,* and that the labour of fetching it from the public springs, or raising it from draw-wells, curtails its use among the poor; that the supply of soft water from the reservoir is confined to a part only of the town; that this water, though turned on every day, is supplied on the intermittent system, a very disadvantageous one, when compared with the system of constant supply at high-pressure, now adopted in many towns.

The chief defects of the intermittent system may be stated as follows:—1st. The necessity which it entails of keeping in every house a tank, or in poorer dwellings, tubs or cans, to contain a sufficient quantity of water for use between the periods of supply; involving, besides a very considerable first outlay for the purchase of these uten-

* Although the water from the reservoir contains a greater variety of salts than the spring water, yet the abundance of chlorides in the latter renders it very hard, while the former is comparatively soft.

sils, and the constantly-recurring expense of repairing or replacing them, as they become injured or destroyed. This, among the poor who cannot afford to purchase iron tanks in the first instance, is a very great evil. 2nd. The water retained in these receptacles becomes very quickly deteriorated; striking evidence was laid before the Commission by Mr. Toynbee and others,* of the rapid and serious change which water undergoes while standing in the crowded rooms of the poor, and of the reciprocal deleterious influence which it exercises in its evaporation. It is also liable to various impurities, both from the tank never being properly cleaned, and from the use, among the poor, of old rum puncheons, tallow casks, or other similar cheap substitutes for a tank, without proper preparation. But apart from these sources of actual impurity, water kept standing, becomes mawkish to the taste, and the poor man is thus often induced to resort to beer to allay his thirst, when he would use good water if it were procurable. 3rd. The room occupied in a small house by the water-butt, renders it very inconvenient. In some small tenements in Rother Ward, I believe the only mechanics' houses in the town furnished with separate taps, a large tub in the living room appeared to me rather a nuisance than an advantage. 4th. Great waste is inseparable from this mode of supply. The poor are always afraid of drawing too little for their wants during the interval of intermission; a larger quantity, therefore, than they really require, is usually taken, and the surplus is thrown away when the fresh supply returns. The cocks also are frequently neglected, and the water suffered to flow away. I have seen two service-pipes in the town lately, from which the taps had been broken off, and the water, when on, always ran to waste. One of them had been in this state for three or four months, and a stone had been removed from the pavement to allow the water to escape into a drain. 5th. Notwithstanding the waste attendant on the intermittent system, the supply it affords is inadequate, as the receptacles employed by the poor are never capacious enough to contain as much water as they *ought* to use for household and personal cleanliness; dirty habits, therefore, are induced and perpetuated among them. 6th. By the intermittent system, courts, and rows of small houses, gene-

* I wish my limits allowed me to quote from the evidence of these witnesses, as nothing can be more impressive than their testimony.

rally obtain their water from common standcocks; and these places, from the people crowding for water when the supply is on, are constant scenes of quarrelling and dissension. Young girls and children, sent for water, are exposed to contact with all sorts of disreputable characters; and this is stated to be, in many places, a great source of demoralization. Moreover, people who are not entitled to it, often obtain water from these cocks.

On the other hand, water, on the high-pressure system of supply, introduced into every house, obviates the necessity for tanks or cans, as the exact quantity required for any purpose, can be taken at any hour of the day or night. It can be shewn, that the saving resulting from the disuse of these articles, is more than sufficient to pay both the first expense of the pipe and tap, and the water-rate of a well-managed company. Mr. Smith, a large owner of cottage property at Preston, where there is a high-pressure company, says, that he has introduced a pipe and tap into every one of his houses, the rents of which vary from 2s. to 2s. 3d. per week, without making any addition to the rent, as he considers himself paid by the increased demand for his houses. Had the supply of water been intermittent, obliging him to use water tanks with balls and cocks, he could never have ventured on the speculation. Mr. Ashton, of Hyde, gives testimony of similar effect, and also bears witness to the improved health and cleanliness of his tenants. The space taken up by the tank or can is added to the room of the mechanic; and the ugly, clumsy contrivance replaced by the tap, which may be enclosed in a sort of case, having the appearance of a bracket, for which several neat designs are given in the tract on Water Supply, published by the London Working Classes Association. The water, retained in the pipe till wanted, loses none of its sparkling, refreshing quality, and is excellent for drinking: the temptation to use beer is thus in great measure obviated. The facility of obtaining water, and the abundant supply, induce in the working man greater cleanliness, both as to his house and person—a fact well established by much important evidence. Under this system, there is no crowding at standcocks and its attendant evils; nor are children liable to the complaints engendered by their being sent out in cold weather, rain or snow, to fetch water, and to wait exposed for some time before they can obtain it.

Baths and washhouses for the poor, establishments which have

proved so beneficial wherever they have been erected hitherto, can hardly be supplied with water except on the high-pressure principle: nor can water-closets for the poor be introduced into small tenements, without the facilities for obtaining water which it affords. But this system, so conducive to the health and comfort of the poor, possesses advantages no less important to the rich, as water can now be supplied on every story of a house; thus saving all the labour of carrying it up and down stairs, an immense advantage in large houses. With rich as well as poor, the abundance induces greater freedom in the personal use of water, by baths, &c., to the great improvement of health. But it is needless to dilate farther upon such points, as they will be comprehended at once by every person of intelligence.

One of the most important results of the high-pressure system, is the security derived from it against destructive fires. A hose can be screwed on a fire-plug in from one to five minutes after an alarm is given, and an uninterrupted stream of water thrown with the greatest facility over any part of the highest house. Those who have witnessed fires in Abergavenny, and seen the confusion by which they are attended, the time expended in getting out the engines and putting them in action, the constant interruptions from stones and dirt filling up the nozzle of the jet, the irregularity of the supply of water, and the labour of pumping, and of passing it in buckets from the fire-plug to the engine, will sufficiently appreciate this advantage. When water is laid on upon every story of a house, the danger from fire is so much diminished, that insurances can be effected at a very reduced cost; and in some towns where the system is adopted, the owners of factories place so much reliance upon it, that they have given up insurance altogether. In the cities of New York and Philadelphia, where many houses are built of wood, and fires very frequent and destructive, water being supplied at high-pressure, fire-engines are now seldom used; and fires, though as numerous, are much less destructive than formerly.

Lastly, the high-pressure system possesses many intrinsic advantages. It is more easily managed, and at less expense, than the intermittent system. The pipes may be even smaller, as the drawing of water is diffused throughout the day, instead of being limited to a few hours; and the water runs more rapidly. The water cannot be allowed to run to waste, as the noise it makes attracts

attention, and is besides a source of much annoyance. For the same reason, the taps cannot be stolen; the noise calls attention to the theft, and the thief, moreover, gets thoroughly drenched with water. The pipes are not so liable to be frozen. The supply can be furnished much cheaper; in Nottingham, 5000 houses are supplied at one penny each per week. The charge is equally low in other places.

Abergavenny is so situated, that the great requisite for high-pressure, viz., an elevated situation for a reservoir, can be obtained with the greatest facility. For the sake of demonstration, my brother, Mr. T. Dyne Steel, C. E., has prepared, at my request, a plan and estimate for new water-works, to supply the town on this system. He proposes the construction of a new reservoir on the Kibby, a little above the Chapel-chain-road, and below the Mill, capable of containing 810,718 gallons; or in round numbers, rather more than eleven days' supply for 6000 persons, at the rate of 12 gallons each per diem; to re-lay all the streets of the town with pipes, including the new Brecon and Merthyr roads and the Groffields, at the following estimate:—

Reservoir.....	£1800	0	0
Piping laid, including the use of old mains	1696	0	0
Land and compensation.....	50	0	0
Contingencies, 10 per cent.	350	0	0
Total.....	£3896	0	0

The top water in the new reservoir would be 213 feet above the highest, and 285 feet above the lowest street level; a pressure sufficient to force any quantity of water much above the top of the highest house. At this estimate, 950 houses, supplied each with one tap at one penny per week, and 400 of these supplied on the second floor in addition, at another penny per week, would return an income of £293. 10s, or more than $7\frac{1}{2}$ per cent. upon the outlay. This sum, however, is but £70. more than the income derived from the present works: it is also more than could be expected, since it is unlikely that 950 houses would take the water at first, even at the low rate proposed.

But we may make the calculation in another way. We may safely conclude, that the families taking the present inefficient supply would take the improved supply at the same rate; that many

of them, say one-third, would be willing to pay 6s. additional for each tap on another floor; that 200, out of the 620 houses at present unsupplied, would take, each, one tap at 12s. per annum, the lowest present rate for a single house: these additions would yield a revenue of at least £140. per annum, or upwards of £3. 10s. per cent. upon the outlay for the new works, leaving the income from the old works undisturbed. It will, I think, be allowed that this estimate of return is really much less than might reasonably be expected from new taps alone; and if water-closets and other conveniences were supplied at a moderate extra charge, a return of upwards of £5. per cent. might well be anticipated. Moreover, the proposed reservoir is perhaps larger than would be absolutely necessary at first; nor would the whole quantity of main piping included in the estimate, be required at the outset, as some of the streets are not yet complete enough to pay their share of the expense.

Mr. T. Dyne Steel suggests, supposing the works constructed, that a two-inch main and service-pipes for the supply of the Union Workhouse, could be added for about £42. How willingly such an expense would be incurred!—and how great would be the boon to the house, the excellent and venerable Chairman to the Board of Guardians can perhaps best testify.

Gas.—It has already been stated that the present gas works are inadequate to furnish the supply of gas now required for the town; that the streets are insufficiently lighted in winter, while in summer no public lights are employed; that the gas supplied is expensive, and of inferior quality. Under these circumstances, it has become evident to the townspeople, that some improvement must shortly be effected. The original contract, having been violated by the proprietor of the works, is now void; and as the old works are probably not worth enlargement, and are moreover badly situated for the supply of the town, the erection of new works would be the best course to adopt. By taking advantage of all recent improvements in gas-making, and the choice of a better site, for instance, the hollow below the Castle, which is 16 feet 6 inches lower than the site of the present works, good gas could be supplied at a price which would defy competition. The railway station, shortly to be erected, will require a supply of gas which could not possibly be provided with the existing machinery. There is no doubt that a

company, with capital sufficient to embark in so promising a speculation, could very soon be formed; but let me here venture to express a hope, that the inconvenience they have already experienced will prevent the Commissioners from ever allowing the supply of the town, with water or gas, to pass out of their own hands. If such establishments will pay any one, they will pay them; and the profits should be applied to public improvements, or to the liquidation of their debt. The Corporation of Manchester has realized nearly £400,000. by its gas-works alone, and this sum has been expended in improving the town. Much valuable evidence has been given before the Health of Towns Commission, to show that water-works, gas-works, sewerage, and paving, should all be in the same hands and under the same authority; as operations in all these works are mutually dependant, and one staff of officers can best attend to the whole; while the public is saved the expense of two or three unnecessary establishments.

As a large quantity of air is vitiated so as to render it unfit for respiration by the products of the combustion of gas, means should be employed to prevent this air from arising with that of the apartments in which the gas is used. An inverted funnel, placed over the gas-burner, may be conveniently employed in shops, the vitiated air being carried by a tube to an aperture in the upper part of the window. A more complete and ingenious, but still very simple apparatus of this kind, used at the Devon and Exeter Institution, is described by Dr. Shapter in his report on Exeter. Combustion is rendered more complete, and the results less unhealthy, by the use of improved burners in place of the common bat's-wing or fan burners so commonly employed in Abergavenny. A very ingenious argand burner, called the "Universal," sold by Mr. Jones, of Bow-street, London, and the burner invented by Mr. John Leslie, 59, Conduit-street, are great improvements upon the common argand.* I have also been shewn a fish-tail burner, so constructed that two jets which issue from it, cross each other immediately on their exit; the light spreads in a plane contrary to that of the jets. By all these contrivances, the light is greatly increased in brilliancy, while the quantity of gas consumed is much diminished. The price

* I have tried these burners in shops in different parts of the town; but at the lower levels, for instance, at Mr. Rees's, in Cross-street, the pressure is insufficient properly to develop the flame, although Mr. Leslie's burner consumes only from four to five cubic feet of gas per hour, and the "Universal" very little more.

of the universal burner, with a glass, is 6s. ; of Leslie's, 7s. ; of the fish-tail burner, which requires no glass, 1s. 6d.

Ventilation.—My limits forbid me to enter, in this place, into any account of the physiology of respiration, for the purpose of shewing how essential to health are abundant supplies of pure air, and means to facilitate the removal from our apartments, of the large quantity vitiated by every breath we draw. It must suffice to mention one or two illustrative facts. For instance, the Inspectors of Prisons recommend for each prisoner, as essential to health and ventilation, not less than 1000 cubic feet of space ; and in the new model prison at Pentonville, from 30 to 45 cubic feet of fresh air per minute is made to pass into each cell ; yet in Abergavenny, there are numbers of rooms, which scarcely contain 1000 cubic feet, in which from four to eight or ten persons sleep every night, without any contrivance for the renewal of the air. The consequence of the above recommendation is, that in well-arranged prisons, the amount of sickness is from ten to thirteen times less than that experienced by the inhabitants of the courts and alleys of large towns. In a new house built for the monkeys at the Zoological Gardens, great pains having been taken to keep it warm, without sufficient regard to ventilation, fifty out of sixty monkeys, put in healthy, died within a month. This happened in the winter, and it was only necessary to open the ventilating apertures constructed for summer use, to render the place salubrious. A canary, hung for a night at the top of a curtained bed, in which people sleep, will generally be found dead in the morning. It may be stated in addition, that many physicians now consider that the breathing of air already vitiated by respiration, is one of the principal exciting causes of consumption : and facts are not wanting which tend most strongly to verify the opinion.

As a first step towards securing a condition so essential to health, care should be taken so to lay out all new streets, and to build and arrange houses, as to afford free space for the access of fresh air. Streets should be arranged, as nearly as possible, in diagonal lines radiating from central open spaces, as thereby the freest ventilation and exposure to the sun's rays, as well as the most direct means of communication, are obtained. The width of streets, a minimum being fixed, should vary according to the nature of the locality : as a general rule, no street should be less than 30 feet wide. Houses

should never be built back to back, as this arrangement effectually hinders free ventilation. Excellent plans are given by Mr. Austin; for houses furnished with every sanitary convenience, to be erected in London, in the room of some miserable dwellings now existing, and calculated to yield a return of £10. per cent. at the rents paid for the old tenements. Other good plans are given by Mr. Loudon, in his work on Cottage Architecture; and by Mr. Chadwick, in his Sanitary Report; but the extensive promulgation of plans of cottages to be erected at from £50. to £70. each, is still a great desideratum, since a house exclusively for himself and his family, is always a great object to the mechanic in small towns. It would be highly important to include in such plans, easy and simple arrangements for the ventilation of each apartment; for though the principles of ventilation have been well expounded by Dr. Reid, Dr. Arnott, and others, yet the subject is somewhat complicated, and requires elucidation by examples, before efficient means for the ventilation of small houses are likely to be adopted by builders. A great point will be gained by diffusion of better ideas of the importance of the subject than they now entertain, among the people of all classes. More, I think, is to be hoped from the invention of cheap forms of window frames and sashes, and increased cheapness of glass, than from repeal of the window-tax, as very few mechanics' houses, in country towns, are liable to the operation of the tax. The deficient number and size of windows in such houses, is always to be traced to the expense of their construction. To the inhabitants of the class of houses next above these, the repeal of the tax, or the plan of Mr. Hickson to assess the tax, not according to the number of windows, but to the size of the rooms to be lighted, would be a great boon.

For the effectual ventilation of an ordinary apartment, two apertures are required; one situated low down for the admission of fresh air, another near the ceiling for the exit of the vitiated air, which always rises: and it is a great object so to contrive these two openings as to prevent any draught from impinging with unpleasant force upon the person. The simplest and most efficient ventilator that I know of, has been introduced by Mr. Toyabee. It consists of a plate of zinc perforated with fine holes, 220 to an inch, which admit a sufficient quantity of fresh air, but prevent it from coming in with such force as to cause a draught. A plate of the size

required to ventilate a room may be fixed in the panel of a door, while another replaces one of the upper panes of a window; or the latter may be so contrived, by fixing the pane of glass in a sliding perforated zinc frame, that the light may be admitted by it as usual. Two of these may be placed, one in the upper, the other in the lower part of a window, without one in the door. The expense is from 2s. to 4s. each. By the extensive introduction of such ventilators in the rooms of the poor of the parishes of St. George and St. James, London, the number of cases of illness in those parishes has been greatly diminished.

The domestic customs, both of the rich and poor, are such as generally to prohibit the entrance of fresh air into sleeping rooms. Before going to bed, shutters are closed, blinds pulled down, window and bed curtains drawn, and all other available means taken to confine the sleepers for the whole night to one unchanged portion of air, which, in the sleeping rooms of the lower classes especially, is lamentably insufficient for healthy respiration. The introduction of a ventilator into every bed-room window, and the disuse of curtains of all kinds, harbours for dust and obstructions to the circulation of air as they are, would alone greatly improve the health of all ranks. The best and most healthy bedstead that I am acquainted with, is the kind usually found in the London Hospitals. That used at King's College Hospital is made of iron rods, in such a manner as to take to pieces with the greatest facility, and it occupies but little room. It is slept in by nearly all the resident officers as well as the patients. I myself can testify, from experience, to its comfort. The price is £1. 16s.

Plans of Towns.—New works for the improvement of towns, as well as the ordinary operations of laying out streets or constructing drains and sewers, are often undertaken without sufficient care to avoid errors of level, which afterwards very materially affect their value and utility. Means whereby such errors may be at once seen and avoided, are afforded by a map or plan of the town, marked with contour lines of equal altitude. The idea of contour lines was suggested to a French engineer, upwards of a century ago, by the observation that the line of deposit left after the subsidence of a flood, marks the same altitude wherever it is followed. Now a plan with contours is one marked with a series of such lines, at regular intervals of altitude above a certain datum. Each line, commencing

at any point, follows an irregular course wherever the variations of the surface may lead, keeping always at the same altitude, till it returns, as it must, to the point at which it set out. It is clear, that a map marked with such lines, at from two to four feet intervals of altitude, would shew, at a glance, the best line of level for a new street or sewer, or the best site for any new work requiring to be placed at a particular elevation. It would be very useful, if, in addition to maps with contours, exact indications of the levels were marked on permanent public objects, in every town. Such arrangements would be the means of incalculable saving in the expense of planning all public works.

Let us now suppose, for the sake of illustration, the town to be provided with a good system of sewers; water mains, on the high-pressure principle, to be laid in every street; privies and cesspools to be prohibited, and water-closets and soil-pans, with drains leading to the sewer introduced in their stead: what would these conveniences cost the working man in addition to the sum he now pays for inefficient and unhealthy arrangements? Take as an example, Trinity-street, one of the new streets in the Groffield. It is 120 yards long, exclusive of the parsonage wall, and when finished, will consist of 20 houses on each side, built, say at an average cost of £70., and bearing a yearly rental of £6. or £6. 10s. each. They are provided with privies, one for every two houses, constructed at a cost of from £3. to £4. each, say £3. 10s., and with draw-wells, three on each side the street, averaging 11 yards deep; constructed with bucket and rope complete, at from 20s. to 22s. per yard, say £1. Privies, then, and wells to supply water to the forty houses composing the street, cost together £136. But the wells answer their purpose badly; sometimes the water is muddy, or it fails, or the well falls in. Two wells in the street have already fallen in, and a third is in such a state that the tenants are afraid to stand very near it. On the other hand, the following is a rough estimate of the expense of the above-mentioned improvements:—

240 ferro-metallic cylinder pipes, 16-inch bore and

2 feet long, at 4s. each, for sewer..... £36 0 0

Digging 4 feet deep, 120 yards, at 8d. per yard.. 4 0 0

Carried over..... £40 0 0

Brought forward.....	£40	0	0
600 ferro-metallic pipes, 3-inch bore, 30 feet for each house, at 7½d. per 2 feet pipe, for house drains	18	15	0
Laying and fixing, at 3s. each drain.....	6	0	0
Sink and soil-pan, enclosed in a box, according to Mr. Foden's plan, fixed, 40 houses at 30s. each	60	0	0
Tenant's communication water pipe, at 7s. p. house	14	0	0
Carriage of pipes, stench traps, and contingencies, 15 per cent.....	20	16	0
Total.....	£159	11	0

This involves an increased outlay of not quite 12s. per house for the improved accommodation. I conclude the water-rate to be more than compensated for by the obviated expense of cleaning privy, and wear-and-tear of water cans, ropes, and buckets. The estimate is purposely a high one. Mr. Austin's self-acting water-closet, and a separate branch drain and sink for domestic use, could be erected at an additional expense of about 25s. per house, and would probably be preferred. Common clay tubes, which have been recommended for drains and sewers, might be obtained at nearly one-half the expense of the ferro-metallic tubes. The latter, however, are best, as they are nearly as strong as cast iron. There is little doubt that they would answer perfectly for water mains, and that ere long they will be used for that purpose. It may certainly be objected to the above statement, that in order to avoid the construction of privies and wells, and to substitute the suggested improvements, the sewer and water main should be laid down at first, and the whole street built at one time; whereas, in such towns as Abergavenny, new streets, especially those composed of small houses, are built piecemeal, three or four houses at a time, by different persons, and are, perhaps, not completed for years. Under these circumstances, it would be impossible to build the sewer or lay the water main till the street is finished; and wells and privies must therefore be made for the use of the inhabitants of the houses first erected. I confess myself unable to suggest any practical answer to this objection, so long as the practice of building streets in the way described is continued. It is, I think, a subject worthy the attention of the legislature. To substitute the improve-

ments specified for privies and wells already made, would cost not less than £4. per house; and although this could easily be done by the plan advised by the Health of Towns Commission about to be mentioned, the expense of the privies, &c., and wells, would remain a dead loss.

But improvements of this nature, however advantageous, are slowly adopted, even in large towns, where great intelligence and capital are employed in building. In small towns, where mechanics' houses are built by persons of very limited capital, and are run up as cheaply as possible by common masons and carpenters, old and inconvenient systems are perpetuated. Besides, these improvements could be effected only on an extensive scale: the above estimate for a sewer in Trinity-street, for instance, presupposes a complete system of sewerage throughout the town; and the inhabitants could never be induced to combine, of their own accord, to effect such an improvement. It became, therefore, an important object with her Majesty's Commissioners, to devise some means whereby arrangements of such immense importance to the public health might be enforced by legislative enactment, while the expense, without being burdensome to any, might fall upon the party really benefited. They accordingly recommended that the construction of sewers, house drains, water-closets, &c., under certain regulations, should be enforced by law, and paid for by money raised upon mortgage of rates to be chargeable for the improvements, sufficient in amount to repay the principal, with interest at 5 per cent., in a period of thirty years. The rates to be paid by the occupier as the party really benefited, and not by the owner; since, to charge the latter, would be not only unjust, but nearly impossible, on account of the varieties of tenure, the frequency of joint-ownership, and the difficulty, in many cases, of ascertaining the real owner. Where, however, the occupation is weekly or monthly, the owner to be charged, and left to indemnify himself by an increased rent. The numerous builders and others examined by the Commission, almost without exception, approved of this plan as in every respect just and feasible. A form of notification for the execution of such works is suggested by Mr. Chadwick in his Sanitary Report. It is accompanied by the subjoined estimate of the weekly expense to the tenant;—

First Outlay per Tenement.	Annual Instalment for Repayment in 30 years.	Annual interest, com- puted at 5 per cent. on Outlay, charged as Rent on Tenant, and Annual Rent of water.	Weekly Charge to the Tenant, or Increased Rent.
£. s. d.	s. d.	s. d.	s. d.
Water-closet,			
Water-tank,			
and Drain 10 8 6	6 11	6 8	0 3
Main Sewer. 5 12 0	3 9	3 6	0 1½
Water.....	..	5 0	0 1
Total	10 8	15 2	0 5½

The following is another similar estimate by Mr. Foden, of the expense of a simpler apparatus for the use of the poorest classes:—

For a soil-pan and curved trap, £1., laying on the water with 8 feet of $\frac{1}{2}$ -inch lead pipe and a stopcock, 10s.; total £1 10 0.

5-inch glazed tile tube, to connect with the soil-pan or sink, at 6d. per foot, say 30 feet. 0 15 0.

Tenants' communication water-pipe, water to be laid on the premises complete, about. 1 0 0.

Suppose the house in a court, tube drains, of 10 inches or 1 foot diameter, would suffice, laid down at an expense of 1s. 6d. per foot, say 18 feet frontage for houses on both sides, or 9 feet each, with tile-trap at entrance 0 15 0.

Total..... £4 0 0

Involving, for repayment of principal and 5 per cent.

interest, by instalments in 30 years, a rental of.. £0 4 10

Or a weekly rental of 0 0 1½

The weekly increased rent of the houses in Trinity-street, which would be chargeable on this plan, for the improvements specified in the estimate previously given, the existing wells and privies being superseded, would amount to the same sum.

The Health of Towns Commission felt themselves justified by the evidence laid before them, in recommending that such arrange-

ments as the above should be enforced by law. They also advised that no works, beyond a certain cost, should be undertaken by Towns Commissioners, except under direction of an Inspector, appointed by a Central Board of Health; that all structural undertakings in towns, of any kind whatever, likely, directly or indirectly, to influence the public health or convenience, should in future be subject to the approval of some skilled officer appointed for each town or district, the appointment to be sanctioned by the central authority; that all new public works should be done by contract, upon open tender, under the inspection of such an officer, who would take care that the utility of the work should not be compromised by careless workmanship or bad material; that in each town or district, a medical officer of public health should be appointed, whose duties would be to investigate the causes of the spread of epidemics, to ascertain the local causes of other diseases, and to suggest the best means for their removal, to verify the fact and cause of each death, to see to its correct registration, and to ascertain the sanitary conditions under which it has taken place; in short, to do all that medical experience and knowledge suggest, to point out and remove the causes of disease in his district: that every slaughter-house and common lodging-house should require a licence, should be placed under proper regulation, and be subject to inspection.

There can be little doubt that the experience of Abergavenny confirms these recommendations, most of which were embodied in the Health of Towns Bill, introduced by Lord Morpeth during the last session of Parliament, and in the Acts which it was intended to incorporate.

At a meeting, however, of the inhabitants of Abergavenny, held when this bill was before the House of Commons, a proposition to petition Parliament in its favour was rejected, some of the Town Commissioners present objecting to the centralizing principle of the bill, on the ground that they considered the residents in a town best qualified to administer their own local affairs, without Government assistance or advice. Some idea of the manner in which these gentlemen have hitherto managed their affairs, and of the minute attention paid by them to the general condition of the town, may be formed from statements already made in this report. It will suffice to add a short sketch of the present state of their affairs.

The money expended upon the public works, as the erection of the market places, the water-works, street improvements, &c., was raised by authority of the Local Acts of Parliament, from time to time, upon Deeds-Poll issued to various persons. These securities are now held by thirty-five different parties, for sums ranging from £25. to £3000.; the total amount due upon them is £8400., bearing interest at £5. per cent. per annum. No account has been kept of the manner in which this sum has been expended; for though each Deed-Poll sets forth the purpose to which the money raised upon it was to be applied, no copy or abstract of them has been taken; and to ascertain their contents from the various holders of them, residing in different parts of the kingdom, would be a work both of time and difficulty. Until the last four or five years, no account, even of the items of yearly expenditure, has been kept, beyond the bankers' book, which, of course, exhibits only the names of parties to whom checks have been paid, but does not specify the items paid for. Although the debt upon the Deeds-Poll was commenced upwards of fifty years ago, no attempt has ever been made to pay off a single farthing of the principal. The present income of the Commissioners may be stated as follows:—

Collectable Street Rate at	£420
„ „ Water ditto	200
Market Tolls.....	390
Sheep's Pens.....	90
Shops and Warehouses	50

Total.....£1150*

But this amount is insufficient to meet the current expenditure, and a debt to the Treasurers, now amounting to about £480., has been accumulating during the last ten years. Some years ago, the accounts were thoroughly examined by one of the most intelligent of the Commissioners; and a method of keeping them, by which a balance-sheet, exhibiting the half-yearly expenses and the amount of rate necessary to cover them, leaving a small surplus to form a sinking-fund for the payment of the debt, was suggested by him; but the proposal was not acted upon, and the usual unvarying rate was continued, with the result before-mentioned. The minute-

* This amount varies somewhat annually, as the markets are let by auction every year.

book of the Commissioners, which shows how great difficulty has been always experienced in obtaining a meeting of a sufficient number to form a quorum, rendering repeated adjournments necessary, even when important business required transaction, amply proves the general apathy of the Board. Each Commissioner in private, deplores the inefficiency and inattention of the body; yet, as a body, they assert their capacity to discharge their functions. The utter groundlessness of which assertion, however, scarcely requires farther proof. But this incapacity is not peculiar to the Abergavenny Board of Commissioners. Evidence to the same effect, of the business habits of similarly-constituted bodies—in comparison with some of which, indeed, the Abergavenny Board is a pattern of diligence and aptitude—has been abundantly produced before Committees of the House of Commons. Narrow views, political and other jealousies, subjection of the intelligent few to the many, jobbing, disregard of scientific advice, and extreme apathy with regard to the objects really requiring their attention, are the characteristics of all such irresponsible bodies. On the other hand, it would not be difficult to show, that had some Government Department, charged with the duty of superintending improvements in towns, existed during the last fifty years, not only would Abergavenny have been saved the greater part of its present heavy debt, but that a large amount of sickness and mortality would have been prevented.

This town also presents a striking example of the necessity for the appointment of officers of health and public works. An Inspector of Nuisances has indeed been appointed by the Commissioners; but the office has been vested in the policeman, a person qualified for its duties neither by station, nor by knowledge of the causes detrimental to health; and the results have already been pointed out. It is also needless to mention instances of public works, planned without judgment and executed without care, which would have been done well and advantageously had they been entrusted to such an officer as the District Surveyor, provided by the Health of Towns Bill.

Again, many advantages will arise from restrictions on the laying out of new streets, or the erection of buildings to be used for public purposes, without the sanction of the Commissioners, and through them, of their District Surveyor. The Report of her Majesty's

Commissioners contains many instances of loss sustained, both by owners of property and by the public, as well as of the evil influence upon health, resulting from ill-planned streets. Mr. Butler Williams, Professor of Geodesy at the Putney College of Engineers, demonstrates, that one of the consequences of the rejection of Sir C. Wren's plan for rebuilding the city of London after the great fire, is a loss of £100,000. per annum on the carriage traffic over Holborn and Ludgate Hills alone, due to the inclinations, or irregular and crooked directions of the streets; besides which, one-third of the yearly disease and mortality of the city, would have been obviated by the adoption of that most admirable plan.

It has been stigmatized as an arbitrary and undue interference with individual right, to prevent a man from laying out streets on his own property in any way he may please; but no principle is more true than that which asserts the subordination of private right to public gain and convenience, much less should the former be allowed to prevent arrangements upon which public health so greatly depends. Moreover, in the case of streets and houses, the ultimate value of private property is always enhanced by subjection to judicious public regulations.

ECONOMY OF SANITARY REFORM.—The strongest inducements to the general public to take an interest in the sanitary question; and to demand from the Government stringent sanitary regulations, is doubtless to be derived from the economy or the gain always resulting from them. It is impossible to pay the slightest attention to the subject, in any one of its varied bearings, without being singularly impressed by the fact, that the arrangements most conducive to health and longevity, are also the most convenient and the cheapest; that we are assisting disease and death, not only by apathy and neglect, but are daily paying high wages for their destructive work; and that undertakings of the first importance, in a sanitary point of view, afford some of the best investments of capital. Among the last, plans for collecting the sewage of towns, and applying it to the land as manure, are already occupying much attention. Captain Vetch, R.E., who has drawn up an able report on the sewerage of Leeds, and furnished the Town Council with a plan for improvements, including arrangements for applying the sewage as manure, in his evidence before the Health of Towns Commission, says, "Some agricultural chemists have estimated the value of the liquid

excrement of each person at 12s. per annum for manure; and if the whole refuse of a town, soluble, and conveyable by water, could be completely conveyed to the purposes of the land, to the value above estimated might be reasonably added half as much more, giving a total of 18s. per head. Leaving, however, such high estimates as not likely to gain credit, however true they may be, few persons who have attended to the subject would hesitate to admit that 5s. per head would be a low estimate for the complete sewage of a large town.* On this principle, he calculated that a clear benefit of £10,000. per annum might be expected after ten years, from the sewage of Leeds on the north side the river, properly applied as manure. Near Edinburgh, the sewer water of a part of the city has been employed for some years for the irrigation of about 300 acres of land. The result of this practice is, that land once worth from 40s. to 50s. per acre, now lets at from £15. to £30., and even £40. per acre per annum. The process has been adopted without proper regulations, and is consequently a source of annoyance to the people living near; but the proprietors of the land have, by custom, acquired a right to the practice, and they demand £150,000. as compensation for its discontinuance. Plans, however, have been proposed for conveying sewer water from towns by pipes, for the irrigation of fields at a distance; the estimates, by scientific men, shewing very large profits. A company, called the Liquid Manure Irrigation Company, is already in operation in the neighbourhood of Manchester. Another has been formed for the application of the sewage of London to agricultural purposes. A report of the proceedings of the former to the directors of the latter company, by Dr. Guy and Mr. Sherborn, published in the first number of the *Health of Towns Journal*, is extremely interesting. This valuable plan will soon be regarded as the natural result of a good system of sewerage in every town, and will form an inexhaustible source of wealth.

* No desire, however, to keep within the limits of probability can render necessary such low estimates of the value of sewage as manure; which, as Mr. Austin, in his Report on the City of Worcester, well remarks, "weaken the arguments in favour of the mighty change about to be effected throughout the country; since, where so little confidence is seen to be given to results actually proved, much dependance cannot be expected from the public for those truths which are not capable of such manifestation." In Flanders, the excreta of a man are valued at £1. 17s. per annum; and in this country can be worth no less. We are now importing guano at a vast expense, from Africa and South America, and at the same time employing our own only for the pollution of our streams, and the propagation of disease.

But measures of sanitary reform are not economical only by leading to undertakings in which capital may be profitably invested; they also result in actual saving of immense sums of money to every class of the community. Let us make a rough estimate of the cost to Abergavenny of one disease—fever. Whatever may be the cause of fever—whether it is simply epidemic and contagious—or whether it is produced by putrid miasms (for on these points physicians are not agreed)*—there is no doubt of this, that its spread is so influenced by the healthy or unhealthy condition of dwellings, that when cleanly means for removing excreta, and preventing emanations from refuse, are adopted, it disappears from places which have previously been its constant residence. It generally attacks adults in their prime; men, probably, on whom families entirely depend. Its average duration is about six weeks. Fifty-seven deaths from fever have occurred in Abergavenny during the last ten years. Supposing 28 of these to have been men of the average age of 30 years, and that the life of each has been thus cut short by 15 years; and that only one in every 12 persons attacked dies, an estimate of fever in this town will stand thus:—

Loss of six weeks' labour of 336 men, at 8s. per week each	806	8	0
Loss of the labour of 28 men for 15 years, at 8s. per week each	8736	0	0
Attendance and medicine for 684 cases, at 10s. per case	342	0	0
Total.....	£9884	8	0
Deduct, say one-third cases unavoidable under any sanitary regulations	3294	16	0
Remainder..	£6589	12	0

or £658. 19s. 2d., the annual cost of fever alone to Abergavenny. This estimate, it will be observed, includes neither the value of female life nor the expense of supporting the families of those thus prematurely taken, nor of funerals.

But let us make another estimate from different, and perhaps more certain data. Referring to Tables I. and VI., we find in ten

* The weight of evidence is decidedly in favour of the former supposition.

years an excess of 181 deaths, between the ages of 20 and 60, in the town, over the rural parishes included in the latter table. This number, reduced to the proportion of the population of the rural district to that of the town, gives 178 as the real excess of deaths in Abergavenny. Supposing half these to have been men of the average age of forty-five, who, had they lived in circumstances as favourable to health as of the inhabitants of the country, would have attained to the age of sixty; the value of their labour to have been 8s. each weekly; and that two-thirds of them left wives and families requiring parish relief; then the loss to Abergavenny, from this preventable mortality, will stand thus:—

	Loss every ten years.		Annual loss.	
	£.	s.	£.	s.
Loss of the labour of 89 men for 15 years, at 8s. per week per man ..	27,768	0	2776	8
Expense to parish, say in round num- bers, 60 families at 2s. 6d. per week each, for 10 years	3900	0	390	0
Total	£31,668 0		3166 8	

This estimate supposes the sanitary state of the rural parishes to be as good as possible, but this is far from being the case. Moreover, the estimate of 8s. per week, as the value of each man's labour, is below the truth, as labourers' wages are seldom less than 10s. per week, nor those of skilled mechanics less than 18s. The above calculations are not mere flights of fancy; they are stubborn facts, and depend for their truth upon the axiom, that capital is accumulated labour. Nor is this assertion obviated by the objection, that the rising generation soon fill the places of those who die thus in the prime of their usefulness, as will presently be shewn.

I abstract the subjoined table from two given in Mr. Chadwick's Sanitary Report, both as a confirmation of the above, and because it sets the economy of sanitary reform in another very striking point of view. It shows the amount of monthly payment by an ordinary family; say a man æt. 40, wife æt. 30, and two children represented as equivalent to one æt. 15, to ensure them 10s. per week each during sickness, computed by Mr. Finlaison, Actuary to the National Debt Office. The table shows the number of days' sickness per annum calculated on by Mr. Finlaison, parallel with the results of the experience indicated:—

Monthly payment for an allowance of 10s. per week during sickness. Mr. Finlaison.		No. of days' sickness allowed for.	Experience of sickness per man in the unhealthy Wynds and Clooses of Edinburgh.	Experience of Benefit Societies in Scotland.	Experience under Sanitary Measures.
	s. d.	Days, &c.	Days, &c.	Days, &c.	Days, &c.
Man at 40 . . .	2 11	9.2	15.1	6.9	2.75
Woman at 30 .	1 11½	6.33	11.0	4.2	2.10
Child at 15 . .	1 3½	5.18	3.5	5.18	0.17
Total per family	6 1¾	20.71	29.6	11.3	5.02

One point more I may mention, before leaving the subject of the economy of health, since it is one of interest to the numerous owners of small houses in Abergavenny; viz., the greater profit derived by the landlord, from healthy than from unhealthy tenements. Mr. Bratt and Mr. Jeremiah Little, extensive owners of small houses in London, attribute two-thirds of the loss experienced in collecting the rents of such houses, to sickness; and the latter gentleman says that he has decidedly found the rent best got from healthy houses. Besides, as healthy houses are those best supplied with conveniences, they are always in the best demand, and the poor are invariably willing to pay a very great proportional increase of rent for such conveniences. These facts must afford a strong inducement to small owners especially, to endeavour to get their houses provided with proper sanitary arrangements.

POLITICAL CONSIDERATIONS.—But the importance of sanitary reform is greatly enhanced by considerations altogether apart, both from its economy, and its influence upon life in the abstract. Towns are increasing so rapidly, and manufactures are absorbing the employment of so large a proportion of the population, that it becomes of the utmost importance to ascertain and to obviate *all* the evil effects arising from this concentration of human beings. It is a very popular opinion, that the high rate of mortality in towns may be regarded as a “terrible corrective” of the pressure of population; but unfortunately this idea is entirely fallacious, for the number of births in any district always increases with the mortality. Thus in Lancashire, where one death takes place to every 37 persons living, one

birth takes place to every 27 persons; in Monmouthshire, one death in 45, and one birth in 31; in Surrey, one death in 55, and one birth in 37. In large towns this fact is still more remarkable. It may be explained thus. Suppose a woman married at the age of 24; she bears a child in nine months; but her health suffers in consequence of the insalubrious condition of her dwelling; her child also suffers, primarily, from the same cause, and secondarily, from the deterioration or suppression of her milk; and dies, say at the age of six months. Now a woman rarely conceives while she is suckling; and stating the natural term for suckling at twelve months, this woman is placed in a condition to conceive a second time six months sooner than she naturally should. She perhaps rears the second child, but loses the third at three months, and again conceives at an early period. These frequent gestations, combined with the evil influences of an unwholesome dwelling, weaken her health still more; she bears one-third more children than her strength can support; two-fifths, or one-half of these, die in infancy, and the remainder grow up scrofulous and unhealthy. The parents, their constitutions broken, by the deleterious influences to which they are constantly exposed, die before their children are old enough to be without parental care and attention, and leave them liable to all the moral evils resulting from too early freedom from restraint. Again, as so many men die young in consequence of their unhealthy mode of life and hereditary vice of constitution, boys of seventeen and eighteen are employed at wages, which in other circumstances men only could obtain; these marry girls, equally immature, and beget a numerous race still more weakly than their fathers, and still earlier to become the victims of the vicious system under which they were engendered.*

It is found that to this predominance of youth in the population of large towns, is attributable the number of trades' unions, strikes, and violent political meetings by which the manufacturing districts are so often disturbed. The older workmen seldom or never join in these demonstrations; and they might be relied upon for aid as special constables to suppress them, should such a proceeding become necessary; but their numbers are so small as to be quite inadequate to act efficiently. The anarchical ideas which ani-

* It is a curious but well-known fact, that the females of all animals, man included, conceive more readily when in bad condition, than when in high health.

mate the population of these districts, are due almost entirely to the immense majority of young and violent, over staid and experienced men ; and it becomes a question, whether, unless powerful measures are taken to remedy this state of things, consequences more disastrous to the nation than we at present dream of, may not ensue. This generation of boys, though powerful for mischief, is yet inefficient for any useful purpose requiring the stamina of an unimpaired constitution. Sir James Macgregor, Inspector-General of the Army Medical Department, says, that it is a matter of daily experience, that the physical and moral qualities of country recruits are of a much higher order than are met with in men who have been reared in large towns ; that the former are less prone to sickness, while they have the greater power of withstanding the inroads of disease, and are better capable of enduring the fatigues and privations of a soldier's life. Only 20 per cent. of agricultural recruits are medically rejected to 47 per cent. of those enlisted in large towns. The metropolitan police experience is similar ; it is rare that candidates for admission from Whitechapel, Spitalfields, and Bethnal-green, are found to possess the necessary physical qualifications ; and the force is chiefly recruited from the open districts at the outskirts of the town, or from Norfolk and Suffolk.

It is a general impression, that the stunted children of large towns are remarkable for their quickness and sharpness of intellect ; but this is a mistake, as has been proved at schools, where they could be compared with healthy well-grown children ; it is extremely difficult to gain or to sustain their attention. A comparative experiment made at Glasgow, exemplified this fact in a very striking manner. A set of children from the unhealthy wynds of the town were placed under the care of one of the most experienced Infant School masters ; another set, from a healthy town district, were confided to the care of one of this man's pupils : this set very shortly outstripped that to which the care of the more experienced master was devoted.

Demoralization.—The evil effects of the unhealthy condition of their dwellings upon the moral habits of the lower classes, have doubtless been made apparent by many of the details already given in this report. We cannot be surprised that persons whose spirits are depressed, and whose vitality is lowered, by the vitiated air they continually breathe, should resort to the stimulus of strong

drinks, or of opium, for relief; nor that a man, who on his return home from his work, finds that home dirty and full of foul smells, should quit it for the comparative comfort of the beer-shop. Nor can we expect a woman, however cleanly by nature, long to maintain efforts to keep her house and person clean, in the face of difficulties which seem insurmountable. The children of parents in these circumstances live in the streets; are there brought in contact with disreputable characters of all kinds, become inured to their modes of thinking and acting, join them in the commission, and partake with them in the punishment of crime. I need not refer to the host of abandoned women, and idle and criminal young men, by which Abergavenny is disgraced, as evidence that these are the true results of the unwholesome state of the dwellings of the poor—testimony to the fact crowds upon us from all sides. The parties best acquainted with the poor are the strongest in their expression of this conviction, which may be summed up in the words of an eminent London builder:—"It may be taken as an axiom, that if you make a working man's home comfortable, he will give up the public-house and its ruinous consequences; and that where a working man's home is little better than a pigstye, that man will be almost an inhabitant of the public-house or beer-shop. I say this confidently, from my experience of the habits of large numbers of the working classes." Again, the moral effect upon the people, of the overcrowded state both of lodging-houses and private dwellings, and the consequent promiscuous sleeping of the poor of both sexes, nay, often of brothers and sisters in the same room or the same bed, may be conceived without my dilating upon so disgusting a subject.

One more point, of great interest at the present moment, requires to be shortly noticed; viz., the influence of sanitary measures in checking the spread of pestilences, a fact which has been verified by repeated observation. In a map of Leeds, prepared by Mr. Baker, the track of cholera in 1832, is shewn to have been nearly identical with that of fever, which always prevails most in the worst drained and worst ventilated districts of a town. Indeed, in this respect, cholera follows the law of all other epidemics. I beg also to refer to the extremely interesting evidence on this subject, contained in the Report of the Metropolitan Sanitary Committee, just published. Since, from the accounts which reach us daily, we have every

reason to expect another visitation from this plague, the subject of sanitary reform now claims especial attention. We cannot be certain that the next time cholera reaches our shores, it will not prevail here, as it sometimes does in eastern countries, decimating the entire population. Surely the prospect of the possibility of such an infliction will induce men to pay some attention to the means best calculated for its mitigation.

In concluding this report on the sanitary condition of my native place, I have only to say, that although my investigations have interested me deeply, I have endeavoured to state on all points, simply and clearly, the naked truth; being convinced, that the advocates of sanitary reform can damage their cause only by needless exaggeration. The unassisted facts suffice to prove, that the best interests of humanity, our prospects of national prosperity, and the future moral condition of the people, greatly depend upon the degree of attention the subject may receive. I therefore make no farther apology for this attempt to awaken in its behalf the interest of my fellow-townsmen.



